



A  
MANUAL  
OF  
A N A T O M Y  
AND  
PHYSIOLOGY.

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T. Gillet, Printer, Salisbury Square.

A  
MANUAL  
OF  
ANATOMY  
AND  
PHYSIOLOGY,

REDUCED AS MUCH AS POSSIBLE TO A TABULAR  
FORM,

For the purpose of facilitating to

*STUDENTS*

THE ACQUISITION OF THESE SCIENCES.

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BY THOMAS LUXMOORE,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, SUR-  
GEON EXTRAORDINARY TO HIS ROYAL HIGHNESS  
THE PRINCE OF WALES, SURGEON TO THE  
HONOURABLE ARTILLERY COMPANY,  
AND TO THE EASTERN DIS-  
PENSARY.

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1805.



TO

SIR WILLIAM BLIZARD, KNT.

F. R. S. AND SENIOR SURGEON TO THE  
LONDON HOSPITAL.

SIR,

HAVING received, under your Tuition, the Rudiments of my Anatomical Education, and at all times experienced from you the most Polite Conduct, it becomes a Duty incumbent on me, publicly to acknowledge it by the Dedication of this Volume to you; nor ought I to pass over unnoticed those Friendly Attentions which I have constantly experienced from your Ingenious Relative Mr. Thomas Blizzard.

I am, Sir,

With the utmost Respect,

Your obedient Servant,

THOMAS LUXMOORE.

## ADVERTISEMENT.

THE Author is induced to present this small Volume to Students of Anatomy, in the hope that, from its Arrangement, it will be found of considerable utility in facilitating to them the knowledge of that Science, and in assisting them in their recollection of its Facts. He trusts also that he has supplied them with a small, yet accurate, MANUAL of ANATOMY and PHYSIOLOGY, the want of which has been so long complained of.

St. Mary Axe,  
October 12, 1805.



# O M I S S I O N S.

*The two first articles omitted from the middle of page 179; the last from the beginning of page 181.*

## MUSCLE ARISING FROM THE ULNA AND INTEROSSEOUS LIGAMENT, AND INSERTED INTO THE PHALANGES OF THE FINGERS.

SITUATION.	NAME.	ORIGIN.	INSERTION.	USE.
	Flexor Digitorum Profundus Perforans.	From the upper anterior and outer part of the ulna, and from part of the interosseous ligament.	Passing behind the Flexor Sublimis and Annular Ligament, its tendons perforate those of the above-mentioned muscle, and are inserted anteriorly into the root of the last bone of each finger.	To bend the joints of the fingers and the wrist joint.

## MUSCLES ARISING FROM THE TENDONS OF THE FLEXOR PROFUNDUS, AND INSERTED INTO THE PHALANGES OF THE FINGERS.

SITUATION.	NAME.	ORIGIN.	INSERTION.	USE.
	Lumbricales.	From the outside of the tendons of the Flexor Profundus.	Into the inside of the first joints of the fingers, and into the back of each of the other joints.	To adduct these fingers, to bend their first joint and to extend the rest.

# MUSCLE ARISING FROM THE WRIST, AND INSERTED INTO THE INTEGUMENTS OF THE HAND.

SITUATION.	NAME.	ORIGIN.	INSERTION.	USE.
	Palmaris Brevis.	From the aponeurosis palmaris and ligamentum annulare.	Into the os pisiforme, and into the integuments covering the Abductor Minimi Digiti.	To aid in contracting the palm.

## ERRATA.

In page 182, for ABDUCTOR METACARPI, &c. read ADDUCTOR METACARPI.  
 In page 263, for DONALIS POLLICIS, read DORSALIS POLLICIS.

A  
MANUAL  
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AND  
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OF ANATOMY IN GENERAL.

**A**NATOMY is that science which teaches us, by dissection, the structure of the body.

PHYSIOLOGY, by observation and reasoning, teaches us the uses of its various parts.

These are either FLUIDS or SOLIDS.

The SOLIDS are divided into

1. BONES, which are the hardest parts of the body, and which give support to the rest.

2. CARTILAGES, which are next in hardness, but which are flexible and elastic.

3. LIGAMENTS, which are still more pliable than the last.

4. MUSCLES, which are *fleshy* and *contractile* in the middle, but *tendinous* at their extremities.

5. MEMBRANES, which are planes of interwoven fibres; and these membranes, when minutely interwoven with each other, constitute

6. CELLULAR or SPONGY SUBSTANCE.

7. VISCERA, which are properly the organs subservient to

Respiration, Circulation, Digestion, &c. as the Lungs, Heart, Stomach, &c.

8. GLANDS, which are composed of Arteries, Veins, Nerves, and peculiar Ducts, and whose office is to separate certain fluids from the blood.

9. VESSELS, which are flexible canals composed of different coats, and dividing into minute branches for the transmission of various fluids.

10. ADIPOSE SUBSTANCE or Fat.

11. The CEREBRAL SUBSTANCE or Brain, of a peculiar nature.

12. NERVES, which are white cords proceeding from the brain and spinal marrow, and expanded over all the body to communicate to it sensation and volition.

ANATOMY is accordingly divided into

Osteogeny, which treats of the Growth of Bones.

Osteology, ..... Adult Bones.

Chondrology, ..... Cartilages.

Syndesmology, ..... Ligaments.

Myology, ..... Muscles.

Bursology, ..... Bursae Mucosæ

Splanchnology, ..... Viscera.

Angiology, ..... Vessels.

Adenology, ..... Glands.

Neurology, ..... Nerves.

&c. &c.

The FLUIDS of the human body are secreted from the BLOOD by various Glands or vessels.

1. Perspirable Matter excreted by the Vessels of the Skin.

2. Sebaceous Matter ..... Glands of the Skin.

3. Urine ..... Kidnies.

4. Ceruminous Matter secreted by the Ceruminous Glands of  
the Ear.
5. Tears secreted by the Lachrymal Gland
6. Saliva.....Salival Glands of the Mouth.
7. Mucus.....Mucous Glands of the Mouth,  
Nose, &c.
8. Gastric Juice .....Stomach.
9. Bile .....Liver.
10. Pancreatic Juice ,.....Pancreas.
11. Seminal Fluid .....Testes.
12. Oil .....Vessels of the Adipose Membrane.
13. Synovia.....Synovial Glands of the Joints.
14. Milk .....Mammary Glands.
15. The Catamenial Fluid from the Uterus.

## OF THE BONES IN GENERAL.

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OF THE STRUCTURE OF BONES.

It was formerly believed that bones consist of *Fibres* and *Lamellæ*; but, by all those who are acquainted with the present highly cultivated state of Anatomical and Physiological science, this doctrine is thrown aside, and that of Professor SCARPA of Pavia substituted. Reckoning it absurd to admit in one and the same bone a different structure, the compact of fibres and lamellæ, and the reticular or spongy of areolæ or cells, Scarpa considered the intimate structure of the epiphysis and diaphyses of bones to be the same; and demonstrated both analytically and synthetically that the cellular, reticular, and vascular parenchyma, constituted the basis in which were secreted the calcareous, phosphate, and other saline matters, to which bones owe their solidity; that their intimate structure is the same with that of the muscles, nerves, and other parts of the body; and the sole difference between them consists in the nature of the secretion and assimilation on which their origin depends.

The LONG BONES consist of a middle portion called their DIAPHYSIS, which is externally *Compact* and internally *Cellular* or formed of *Cancelli*, upon which the membranous bags of the marrow is stretched; and of extremities called their EPIPHYSES, which internally are *Spongy*. The FLAT OR BROAD BONES, as well as the long ones, have APOPHYSES; which differ from the Epiphyses in being more properly parts of the same bone, and less easily separable from it, no layer of cartilage intervening between them.

## PERIOSTEUM.

This is a membrane which envelopes all the bones for the purpose of conveying to them vessels, and of giving attachment to ligaments and muscles, by the expansion of whose tendons its thickness is increased. It also strengthens the conjunction of bones with their cartilages and epiphyses, and allows the muscles easily to slide over them.

## THE PERIOSTEUM INTERNUM

Lines the internal cavities and cancelli of bones, and forms the bags of the marrow.

## THE MARROW

Is secreted from the blood by minute arteries, which ramify upon these bags, and is deposited within them.

In SOEEMMERRING'S opinion its use is to render the bones comparatively lighter.

The marrow is bloody in children, oily in adults, and watery in old people. The arteries which secrete it, penetrate generally the middle of the bones by very oblique canals, deriving in their passage a coat from the periosteum.

## THE VESSELS OF BONES

Pass through numerous little orifices which cover all their surface, but are largest near their extremities. As animals advance in age these become less capacious.

The extreme vascularity of bones is demonstrated by the tinge which the bones of animals assume when the rubia tinctorum is mixed with their food.



## NAMES OF THE PARTS OF BONES.

When a bone is topped by a roundish ball, it is called its *head*; a projecting point of it is denominated a *process*; a rough elevation of it is named a *tuberosity*; when a process rises narrow and afterwards enlarges, the narrow part is called its *cervix* or *neck*; a long projection is denominated a *spine*.

Deep cavities are named *cotylloid*; superficial ones *glenoid*: *pits* are small but deep depressions; *furrows*, long narrow canals formed in their surface; *notches* or *nitches* are small cavities in the edge of a bone; *fossæ*, large deep cavities upon its surface; *sinuses*, large cavities within the substance of bones with small apertures; *foramina*, holes penetrating their substance; and these, when continued within a bone, are called *canals*.



## OF OSTEOGENY.

Bones consist of a calcareous phosphate deposited in membranes or cartilage. Those deposited between membranes are soonest formed, and constitute the strongest of the fœtal bones, e. g. the bones of the cranium; while those deposited in cartilage are much later of being formed, and are proportionally the weakest of the fœtal bones, e. g. the epiphyses.

The progress of that ossification which takes place between membranes, may be easily observed in the parietal bone of a fœtus, where it assumes a radiated form. The furrows, which alone give it the radiated form, are merely passages for blood-vessels.

Ossification commences in the middle of the cylindrical bones in the form of a broad and flat ring, surrounding the internal periosteum, and surrounded by the external.

The teeth are likewise formed independently of cartilage.

The other species of ossification, commencing in cartilage, begins either by one or more bony points. The cartilage around these always seems vascular, and by the point of a knife gritty substance may be detected in them.

These are the most important facts relative to the two species of ossification; but the particular state of the ossific process in each bone, at any given period, cannot be described until the adult bones themselves have been explained, and therefore to the description of each of these shall be subjoined its state in children born at the ordinary time. The following rules, however, must be attended to :

1. When a part of a bone is mentioned as cartilaginous, it must be understood that at eight years of age it becomes ossified and united.

2. Such as become epiphyses are not even then united, nor does the complete union take place till about twenty years of age.

## OF ARTICULATION IN GENERAL.

In the connexion of bones, the term *SYMPHYISIS* expresses the *connecting substance*, *SYNARTHROSIS* expresses *immoveable* and *DIARTHROSIS* *moveable conjunction*. These, therefore, are the Genera of Articulation, which are subdivided into a variety of Species. Of Symphysis there are five Species, of Synarthrosis four, and of Diarthrosis also four. The last Species of Diarthrosis is moreover divided into three Varieties. The whole of these will be best explained in the form of a Table.

### Genus I.—Symphysis.

- Species 1. *SYNOSTOSIS*, where osseous matter unites bones, formerly separate, as the sphenoid and occipital, or the ilium, ischium, and pubis.
2. *SYNCHONDROSIS*, where cartilage is the connecting substance, so the ossa pubis, the ribs and sternum, &c. are joined.
3. *SYNDESMOSIS*, where ligaments connect bones, as in all the moveable articulations.
4. *SYNNEUROSIS*, where membranes connect them, as in the bones of the fore arm and of the leg.
5. *SYSSARCOSIS*, where muscles pass from one bone to another, as in all moveable articulations.

### Genus II.—Synarthrosis.

1. *SUTURE*, where the margins of bones are indented into each other, as in junction of the frontal with the parietal bones.
2. *HARMONIA*, where straight, though rough margins, unite bones, as those of the face.

3. GOMPHOSIS, where one bone is fixed into another, as the teeth in their sockets.
4. SCHINDYLESIS, where a spine of one bone is received into a furrow of another, as the processus azygos of the sphenoid bone is received by the vomer.

Genus III.—Diarthrosis:

1. AMPHIARTHROSIS, where obscure motion only exists, as in the connexion of the tarsal and metatarsal bones.
2. ARTHRODIA, where a superficial cavity of one bone receives the round head of another, as in the junction of the first and second bones of the thumb, &c.
3. ENARTHROSIS, when a deep cavity of one bone receives the round head of another, as the acetabulum of the os innominatum does the head of the os femoris.
4. GINGLIMUS, where the motion, confined to two directions, resembles that of a hinge.  
This last species is divided into several varieties.



- Variety 1. GINGLIMUS TROCHOIDES, where one bone turns on another as a wheel on its axis. Thus the first moves on the tooth-like process of the second cervical vertebra.
2. GINGLIMUS SIMPLEX, that sort of articulation where several prominent and hollow surfaces of

two bones move on each other within a capsular ligament, as in the knee, elbow, &c.

Variety 3. GINGLIMUS COMPOSITUS, where bones are articulated with each other at different points, and at each possess a distinct motory apparatus, as two vertebræ are joined by their oblique processes.

## OF THE SKULL AND ITS SUTURES.

The skull is divided into the CRANIUM or brain-case, and the BONES OF THE FACE.

The upper part of the Cranium is smooth externally, and covered with a periosteum, which in that situation changes its name, and is called PERICRANIUM. Internally it is also smooth, except where it is furrowed by vessels or marked by the convolutions of the brain. The inferior part of the cranium is extremely irregular, owing to the attachment of ligaments and muscles, and the transmission of vessels and nerves.

Its bones are pretty generally composed of two TABLES, and an intermediate DIPLÔE. The external table is thickest, and the inner, from its thinness and brittleness, is named VITREA. Their number is eight, six of them being called proper, and the other two common to it and to the face. The six proper are the OS FRONTIS, two OSSA PARIETALIA, two OSSA TEMPORUM, and OS OCCIPITIS. The common are the OS ETHMOIDES and OS SPHENOIDES.

It is however evident that the Os Frontis is as truly one of the bones common to the cranium and face as is the ethmoides or sphenoides.

The *os frontis* forms the anterior part of the cranium; the *ossa parietalia*, its superior and some of its lateral parts; the *ossa temporum*, the inferior part of its sides and some of its base; the *os occipitis*, its posterior part and a greater portion of its base; the *ethmoides*, the middle of the anterior part of its base; and the *sphenoides*, the middle of its base.

These bones are connected to each other by seven sutures or divisions, which are the *Coronal*, *Lambdoidal*, *Sagittal*, two *Squamous*, *Ethmoid* and *Sphenoid*.

## THE CORONAL SUTURE

Extends over the head from within an inch and half of the external side of one orbit of the eye to the same distance from the other, uniting the frontal and parietal bones.

## THE LAMBDROIDAL SUTURE

Commences behind the crown of the head, and stretching downward and forward on each side in the form of the Greek  $\Lambda$ , it connects the parietal and occipital bones. Its further continuations into the base of the cranium, are called *additamenta suturæ lambdoidis*.

About the commencement of this suture, small bones, called *triquetra* or *wormiana*, frequently occur.

## THE SAGITTAL SUTURE,

Running longitudinally from the middle of the coronal to the commencement of the lambdoidal, connects the two parietal bones.

## THE SQUAMOUS SUTURES

Are situated somewhat higher than the external ear on each side, and are formed by the squamous part of the temporal bone overlapping the inferior edge of the parietal. Their posterior serrated part is denominated the *additamentum suturæ squamosæ*.

N. All the sutures lying under the temporal muscle are Squamous.

## THE ETHMOIDAL SUTURE

Surrounds the bone of that name.

## THE SPHENOIDAL

Surrounds the Sphenoid.

The two last-mentioned sutures are partly, and the two following ones entirely, common to the bones of the cranium and face.

#### THE TRANSVERSE SUTURE

Extends quite across the face from the external canthus of one orbit to that of the other. On the inside of the orbits it is made out by the ethmoidal.

#### THE ZYGOMATIC SUTURES,

Slanting downward and backward, join the zygomatic process of the temporal bone to that of the cheek bone.

The BONES OF THE FACE are limited superiorly by the transverse suture, and posteriorly by the sphenoides. The two great divisions which they form, the SUPERIOR and INFERIOR MAXILLÆ, are separated by the mouth.

The *Superior Maxilla* consists of twelve bones and a thirteenth which is azygos, and sixteen teeth. These are two OSSA NASI, OSSA LACHRYMALIA, OSSA MALARUM, OSSA MAXILLARIA SUPERIORA, OSSA PALATI, OSSA TURBINATA INFERIORA, and one VOMER; four *dentes incisivi*, two *cuspidati*, four *bicuspides*, and six *molars*, the two last of which are called *dentes sapientiæ*.

The *Inferior Maxilla* consists of one bone and the same number of teeth.

In the Superior Maxilla, the *ossa nasi* form the upper part of the nose; the *ossa lachrymalia* are at the inner sides of the orbits anteriorly; the *ossa malarum* are, as their name indicates, the bones of the cheek; the *ossa maxillaria* form the upper jaw, properly so called, as well as the sides of the nose and the roof of the mouth; the *ossa palati* contribute to the back of the palate, the nares, and the orbits; the *ossa turbinata* are placed in the nares, which the *vomer* divides.



These bones are connected to those of the Cranium by the Transverse and Zygomatic Sutures, and to each other by seventeen sutures and by Schindylesis and Gomphosis. The Zygomatic and transverse are already described.

#### THE LONGITUDINAL NASAL SUTURE

Is placed longitudinally in the middle of the nose, connecting the two ossa nasi.

#### THE OBLIQUE NASAL

Are at each side of the nose, connecting the ossa nasi to the ossa maxillaria superiora.

#### THE TRANSVERSE NASAL

Are on the middle of the sides of the nares, connecting the ossa turbinata to the ossa maxillaria.

#### THE LACHRYMAL

Surround the groove for the lachrymal sac, connecting the ossa lachrymalia to the nasal processes of the ossa maxillaria superiora.

#### THE INTERNAL ORBITAR

Extend from the middle of the edge of the inferior part of each orbit, to the edge of the foramen lacerum inferius, connecting the ossa malarum to the ossa maxillaria superiora.

#### THE EXTERNAL ORBITAR

Are continued anteriorly from the ends of the internal orbitar to the lower part of the os malæ on each side, connecting that bone to the ossa maxillaria superiora.

#### THE MYSTACHIAL

Passes from the anterior point of the vomer to between the two middle dentes incisivi, connecting the ossa maxillaria superiora.

#### THE LONGITUDINAL PALATINE

Extends from between the two middle dentes incisivi backward through the middle of the palate, connecting the palatine

processes of the superior maxillary and palate bones on one side to those of the other.

#### THE TRANSVERSE PALATINE

Runs across the palate near its posterior part, connecting the palatine processes of the superior maxillary to those of the palate bones.

#### THE PALATO-MAXILLARY

Are situated on each side at the back of the nares, connecting the posterior part of the maxillary bones to the anterior part of the palate bones.

#### THE SPINOUS

Is in the middle of the base of the nares.

#### THE SCHINDYLESIS

Connects the edges of the septum narium.

#### GOMPHOSIS

Connects the teeth to their sockets in the alveolar processes.

## OSTEOLOGY.

## BONES OF THE HEAD.

## OS FRONTIS.

## GENERAL DESCRIPTION.

The Os Frontis is situated in the anterior part of the skull, and constitutes the forehead and the upper part of the orbits. It is therefore very properly divided by Soemmering into the proper Frontal and the Facial portion. The Frontal or superior is convex externally and concave internally, with a serrated semicircular edge, and is composed of two plates or tables and an intermediate spongy substance called Diploe, while the facial, consisting of numerous processes and depressions, is extremely irregular. The whole bone bears considerable resemblance to a shell of the concha bivalvis or common cockle. It is sometimes divided down the middle by a longitudinal suture passing from the centre of its semicircular edge to that part of its irregular portion which in the recent subject constitutes the root of the nose. This is most frequent in females.

## PARTICULAR DESCRIPTION.

## INTERNAL SURFACE.

ELEVATIONS. In number Nine.\* From the middle of the facial or inferior portion of the bone, projecting downward is

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\* That is, considering Pairs as single foramina, which is necessary, because in those bones which are not azygos, single

the *Nasal Process*, upon which the ossa nasi rest;—on each side of it, at the distance of half an inch, are the *Internal Angular Processes*, so called because the inner angles of the Palpebræ are situated there;—elevated from these, and passing outward in an arch-like form, from the central to the lateral parts of the bone, are the *Superciliary Ridges*, to which are attached the Frontal Muscles, and on which lay the Cilia or Eyebrows,—the superciliary ridges terminate in the *External Angular Processes*;—the posterior parts of these at the distance of a quarter of an inch from the anterior have been denominated the *Temporal Processes*,—from which arise and pass in an arch-like form backward the *Temporal Ridges* of the bone, and to both of these parts the Aponeurosis or Membranous Expansion of the Temporal Muscle is fixed. At the distance of an inch above the Internal angular processes are the *Eminences of the Frontal Sinuses*—cavities contained within the bone;—and from behind the superciliary ridges the *Orbital Plates* project backward.—These are the elevations of the Facial portion.—Upon the Frontal portion, at the distance of an inch and a half above the middle of the Superciliary ridges, are situated the two *Eminences* which, in the Fœtus, were the *Points of Ossification*.

DEPRESSIONS. In number Five. Immediately behind the Superciliary ridges, upon the inferior surface of the orbital plates are situated the *orbital depressions* of this bone;—toward the anterior part of the nasal side of these depressions, or just behind the internal angular processes are the small *depressions*

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foramina alone present themselves, and certainly some degree of uniformity of description ought to be maintained between both kinds.

for the cartilaginous pulleys of the *Obliqui Superiores Oculorum*;—toward the outer or temporal side of these depressions, somewhat behind the external angular processes are the *Lachrymal Depressions*;—between the two orbital plates is situated the *Ethmoidal Fissure*;—and behind the temporal processes are the *Temporal Depressions*.

**FORAMINA.** In number One pair. About one-third from the inner, and two-thirds from the outer angles of the orbits, upon the edges of the Superciliary ridges, are situated the *Superciliary Foramina*, which transmit the Frontal twigs of the Ophthalmic nerve, artery and vein.—Under the description of the Frontal bone, the *Foramina Orbitaria Interna* are generally described; but this is improper, because they are formed mostly in the Ethmoid bone, and because the nerves and arteries which they transmit are destined to be distributed to the nose, which is more connected with the latter bone.

#### INTERNAL SURFACE.

**ELEVATIONS.** These are of two kinds. From the anterior part of the ethmoidal fissure, a *Spine* perpendicularly ascends to the middle of the semicircular edge of the bone; to this spine the *falx cerebri*, a doubling of the *dura mater*, one of the membranes of the brain, is attached.—All over the internal surface of the bone, especially above the orbital plates, are numerous *Elevations* which pass between the convolutions of the brain.

**DEPRESSIONS.** Besides the general concavity of the bone which receives the anterior lobes of the brain, these are of two kinds. The whole internal surface of the bone is marked by *depressions* from the convolutions of the cerebrum;—and the frontal spine is *furrowed* to receive the longitudinal sinus.

**FORAMINA.** In number Two. At the root of the Spine is

situated the *Foramen Cecum*, in which a process of dura mater is fixed, and when pervious, an artery and vein pass through it to the nose.—On each side of this, but situated more inferiorly at the anterior part of the ethmoidal fissure, are the *Openings of the Frontal Sinuses*.

#### ARTICULATION.

The semicircular part of the *Os Frontis* is joined to the *ossa parietalia*,<sup>6</sup> by the Coronal suture which passes from an inch and half behind the external angle of one orbit, over the top of the cranium to the similar place of the other side. From the ends of the coronal suture to the external angular processes, this bone is connected to the sphenoid by the Sphenoidal suture. At the external angles of the orbits, it is joined by the Transverse suture to the *ossa malarum*; to these it adheres one third down the outsides of the orbits; whence to the bottom of the orbits and a little upward upon their internal sides, the orbital processes are connected to the sphenoid bone by the same suture. In some skulls, a discontinuation of these two bones appears at the upper part of the long slit near the bottom of the orbit. On the inside of each orbit, the same suture connects the orbital process to the *os planum* of the ethmoid and to the *os unguis*. The transverse suture afterwards joins the frontal bone to the nasal processes of the *ossa maxillaria superiora*, and to the nasal bones. Lastly, its nasal process is connected to the nasal lamella of the ethmoid bone.

#### FOETAL STATE.

In a fœtus of nine months, this bone is divided down the middle; the superciliary foramina are not formed; the orbital processes are not thoroughly ossified; and there are no sinuses within the bone.

## USE.

To defend and support the anterior lobes of the brain, to constitute the forehead, and a great portion of the orbits, to make up the septum narium by means of its nasal process, and the organ of voice by means of its sinuses.

## OSSA PARIETALIA.

## GENERAL DESCRIPTION.

These form all the superior and some of the lateral parts of the cranium. They are convex externally and concave internally; composed of two tables and an intermediate diploe; and somewhat of a quadrangular form. Their sides are superior, inferior (which is semicircular), anterior and posterior; while the names of their angles are composed of the names of the sides which form them; as, anterior superior, and anterior inferior (which is produced into a process), posterior superior and posterior inferior.

## PARTICULAR DESCRIPTION.

## EXTERNAL SURFACE.

ELEVATIONS are Two in number. Somewhat lower than the centre of the bone is a protuberance which in the fœtus was the *Point of Ossification*;—about half an inch below this a *Semicircular Ridge* is extended from the anterior to the posterior side of the bone: it gives origin to the temporal muscle; and besides these there are numerous elevations on the outside of the inferior edge of the bone which join corresponding depressions of the temporal bone to form the squamous suture.

DEPRESSIONS. None.

FORAMINA. Of these there is only one, situated toward



the posterior end of the upper side of each bone, for the transmission of an artery to the dura mater and a vein to the longitudinal sinus.

#### INTERNAL SURFACE.

**ELEVATIONS.** These are in number Two. Along the upper edge of the bone a *Ridge* is observable which forms one side of the Groove for the Longitudinal Sinus;—and over the inferior posterior angle of the bone another passes which constitutes one side or portion of the Groove for the lateral sinus. Besides these there are common to this with the other bones of the cranium numerous elevations which pass between the convolutions of the cerebrum.

**DEPRESSIONS.** These are of three kinds. One *Groove* along the superior side of the bone, and another over its inferior posterior angle for parts of the Longitudinal and Lateral Sinuses;—A *Furrow* passing up its inferior anterior angle, and another over its inferior side for the anterior and posterior branches of the arteria meningeae media;—and numerous *Depressions* for the convolutions of the cerebrum. There are also sometimes *Pits*, by no means for the latter purpose, but merely for the transmission of vessels. Authors have in general erred as to their use.

**FORAMINA.** None.

#### ARTICULATION.

Anteriorly the ossa parietalia are joined to the os frontis by the Coronal suture; inferiorly to the ossa temporum by the Squamous suture; and at their inferior anterior angle to the sphenoid bone by the Sphenoidal suture; at their upper edge to each other by the sagittal; and at their posterior edge to the os occipitis by the Lambdoidal.



## FOETAL STATE.

In a fœtus of nine months, the superior angles of these bones are wanting and give place to the mere membranous expansions, Bregmata or Fontenelles; their sides are likewise incomplete; nor are they perforated by any foramen.

## USE.

To constitute the superior part of the skull, and to protect the middle lobes of the cerebrum.

## OSSA TEMPORUM.

## GENERAL DESCRIPTION.

These bones are situated at the sides and base of the cranium, and are of an extremely irregular figure; being smooth above with a thin semicircular edge, which portion is named *Os Squamosum*; thicker and more irregular posteriorly, which is called *Pars Mamillaris*; and still more thick and irregular inferiorly, where becoming smaller they pass horizontally inward and forward, and assume the name of *os petrosum*.

## PARTICULAR DESCRIPTION.

## EXTERNAL SURFACE.

**ELEVATIONS.** These are in number Three. The *Zygomatic Process* arises with a broad base from the inferior edge of the squamous portion of the bone. The forepart of the base of this process constitutes that *oblong tubercle*, in the recent subject covered by cartilage, over which the condyle of the lower jaw plays. Having run outward for a short way, the

process then turns forward to join a corresponding process from one of the facial bones, the os malæ, and to form a jugum under which the temporal muscle passes. Its upper edge has the aponeurosis of that muscle fixed to it, while its lower edge gives origin to a portion of the massiter.—From the second portion of the bone arises the second process. It is called the *Mastoid* or *Mamillary*; internally it is composed of large cells, and externally it gives insertion to the mastoid, trachelo-mastoid and part of the splenius muscles.—From the third portion of the bone arises its third process, named the *Styloid*. From the inferior surface of the os petrosum, it stands obliquely downward and forward; giving origin to the styloglossus, stylo-hyoideus and stylo-pharyngeus muscles, a ligament to the os hyoides, and another to the angle of the lower jaw.—Besides these greater processes, however, there are also some smaller ones. One of these, under the name of *Vaginal*, surrounds the base of the styloid,—and another stretching semicircularly from the zygomatic to the mastoid process, and forming the lower edge of the meatus auditorius externus, is named the *Auditory*.

DEPRESSIONS. These correspond in number to its processes and are connected with them. Behind the zygomatic, but before the vaginal and auditory, is the *Articular Cavity* for the condyle of the lower jaw. Its posterior part is occupied by part of the parotid gland, and in its middle is a fissure called the *Fissura Glasseri*, which transmits the Laxator Tympani major and Chorda Tympani.—Within or behind the mastoid process, a long *Fossæ* gives rise to Digastricus;—and within or behind the styloid is a *Cavity* which forms part of the Jugular Foramen, transmitting posteriorly the Jugular Vein and anteriorly the par vagum, glosso-pharyngeal nerve and nervus

accessorius.—Some consider as a depression of this bone, that formed by the zygomatic process anteriorly, and denominate it the *Temporal Depression*.

FORAMINA. These are in number Five. The first is the *meatus Auditorius Externus* or passage to the membrana tympani, situated between the zygomatic and mastoid and above the auditory process.—The second, between the mastoid and styloid processes, is called *Foramen Stylo-mastoideum*, and transmits the portio dura of the seventh pair of nerves.—The third foramen is situated anteriorly, and a little internally to the styloid process. It is called the *Foramen Carotideum*, and the canal proceeding from it first upward and then forward is denominated *Canalis Caroticus*. It transmits the Carotid artery, and the beginning of the Intercostal nerve.—The fourth foramen is situated toward the anterior point of the petrous portion above the former. It is the commencement of a canal which passes backward to the tympanum, and which is called the *Eustachian Tube* or *Iter a palato ad Aures*. Within its upper part is situated the *Semicanal* of the Tensor Tympani.—The fifth hole is situated behind the mastoid process, and may be called *Mastoideum*. It transmits an artery to the dura mater, and a vein to the lateral sinus.

#### INTERNAL SURFACE.

ELEVATIONS. These are of Three kinds. The squamous portion has internally numerous *Elevations* which pass between the convolutions of the brain;—The mamillary portion has on it *Ridges* which form the sides of a portion of the lateral sinus;—and the petrous portion by the meeting of its superior and posterior sides, forms a *Ridge* to which the Tentorium is fixed.

DEPRESSIONS. These are also Three in number, and correspond with the processes. The *Depressions* on the Squamous portion are caused by the convolutions of the cerebrum;—a *Furrow* on the mamillary portion by the lateral,—and another on the ridge of the petrous portion by the superior petrosal sinus. The inferior petrosal sinus also frequently marks the inferior edge of the posterior surface of this bone.

FORAMINA are Five in number. In the middle of the posterior surface of the petrous portion is situated the *meatus Auditorius Internus*, which transmits the Portio Dura of the Seventh Pair into the commencement of the Fallopian Aquæduct and the Portio Mollis, by numerous small foramina, into the Vestibulum and Semicircular canals. Through it also an artery is sent to the ear.—About half an inch external or posterior to this on the same side of the bone, may be seen the opening of the *Aquæductus Vestibuli*;—and about the sixth of an inch below it that of the *Aquæductus Cochleæ*.—On the anterior or superior surface, a small *Foramen* transmits the Vidian nerve to join the portio dura in the aquæduct and small blood-vessels accompany it.—The *Mastoid Foramen* is also seen opening into the furrow of the lateral sinus; and between the anterior part of the petrous portion and the sphenoid bone, a *foramen common* to both is formed, occupied in the recent subject, by cartilaginous substance. The other *common foramen*, formed by this and the occipital, has already been noticed.

#### ARTICULATION.

Superiorly these bones are joined to the parietal by the Squamous sutures and their additamenta; posteriorly to the occipital by the lambdoid suture and its additamenta; ante-

riorly to the sphenoid by the sphenoidal, and to the ossa malarum by the zygomatic; and to the maxilla inferior as shall afterwards be described.

#### FOETAL STATE.

In a nine month's foetus, the mastoid and styloid processes are not formed; instead of the meatus auditorius there exists only a bony ring to which the membrana tympani is fixed; on the posterior side of the bone the superior and posterior semicircular canals may both be seen, and underneath the former a considerable cavity runs backward; the anterior side of the tympanum is incomplete, and the squamous portion, with the ring, is easily separable from the rest of the bone.

#### USE.

To support laterally the middle lobes of the brain; to transmit certain vessels and nerves; to contain the organ of hearing, and to constitute part of the temples and of the basis of the cranium.

### OS OCCIPITIS.

#### GENERAL DESCRIPTION.

Is situated in the posterior and inferior part of the cranium. It is convex externally, and concave internally, and consists of two tables and an intermediate diploe. Its form is irregularly rhomboidal; its superior angle being obtuse, and its inferior one stretching into a long process called the *Cuneiform*.

#### PARTICULAR DESCRIPTION.

##### EXTERNAL SURFACE.

**ELEVATIONS.** On each side of the great hole somewhat an-

teriorly, are situated two oblong convex projections named *Condyles*, for articulation with the first vertebra. Their internal sides are highest, and they approximate more anteriorly than posteriorly. A *Roughness* around them gives attachment to their capsular ligament, and the lateral ligaments of the second vertebra are fixed to another before them.—Externally to the posterior part of each of these a *Rough Elevation* gives attachment to the rectus lateralis.—The *Edge* of the great hole between the two condyles, has fixed to it the ligament of the anterior arch of the Atlas, and the Perpendicular ligament of the Dentatus.—The posterior *Edge* has the ligament of the posterior arch of the Atlas attached to it.—On the posterior part of the bone are two transverse and one longitudinal ridge. The *Superior Transverse Ridge*, with the *Spine* in its middle, has fixed to its upper edge the Occipito-Frontalis, and to its inferior the Trapezii.—The *Inferior Transverse Ridge* has the Recti Majores Postici attached to its middle, and the Obliqui Superiores to its lateral parts.

DEPRESSIONS. Between the superior and inferior ridges is a considerable *Hollow*, to the middle of which the Complexi are fixed, and to its external part the Splenii.—Below the inferior transverse ridge are *Depressions* for the Recti Minores Postici.—On the outside of the condyles are *Semilunar Cavities*, forming part of the foramina already described, as common to this and the temporal Bone.—Immediately before the condyles are two small *Depressions* for the Recti Minores Antici, and anterior still to these other two for the Recti Majores Antici.

FORAMINA. Immediately behind the cuneiform process and the two condyles, is situated, the FORAMEN MAGNUM, for the transmission of the Medulla Spinalis, the Nervi Accessorii, the Vertebral Arteries, and frequently the Vertebral Veins.—Behind each condyle of the bone is the *Foramen Condylideum*



*Posterior* for transmitting the Cervical Veins,—and before each the *Foramen Condylloideum Anterior* for the exit of the ninth Pair of Nerves.

## INTERNAL SURFACE.

ELEVATIONS. Upon the concave surface of the bone a *Crucial Ridge* presents itself; to its upper portion the Falx Cerebri is fixed, to its inferior the Falx Cerebelli, and to its lateral the Tentorium.

DEPRESSIONS. The upper portion of the crucial spine is *furrowed* for the Longitudinal Sinus,—the inferior for the Occipital,—and the lateral for the Lateral Sinuses.—On each side the superior portion are *Depressions* for the Posterior lobes of the Cerebrum—and on each side the inferior for the Cerebellum.—Immediately before the inferior depressions, part of the *Furrows* for the ends of the lateral sinuses are seen,—and the Cuneiform process is *believed* for the Medulla Oblongata.

FORAMINA. The Great Foramen is of course seen internally as well as the lesser ones, but these last change their relative situations, both appearing superior to the condyles.

## ARTICULATION.

The upper part of this bone is joined to the ossa parietalia by the Lambdoid, its sides to the temporal bones by the Additamenta of that suture, and its cuneiform process to the body of the Sphenoid by cartilage in children, and by intimate union in adults. Its condyles also are articulated by Ginglymus Compositus to the Atlas.

## FOETAL STATE.

In the fœtus, the cuneiform process, the sides of the great foramen, and all that portion of the bone which is situated

behind it constitute four distinct portions. Fissures are often seen in the posterior portion, and the condyles are formed between the three anterior.

#### USE.

To form the posterior and some of the inferior part of the cranium, to contain and protect the posterior lobes of the cerebrum, the cerebellum and the medulla oblongata, and to transmit the medulla Spinalis.

## OS SPHENOIDES.

### GENERAL DESCRIPTION.

The sphenoid bone is situated in the middle of the base of the cranium, and extends laterally from one temple to the other. It is of an irregular figure, and is divided into a *Body*, two *Ala*, and two *Pterygoid portions*.

### PARTICULAR DESCRIPTION.

#### THE BODY

EXTERNALLY has one

**ELEVATION.** The *Processus Azygos* which stands forward to divide the Nares. Its

**DEPRESSIONS** are one on each side of the *processus azygos* which it contributes to the cavity of the nares. Its

**FORAMINA** are also two, one on each side, being the *openings of the Sinuses* within the bone. The external apertures of the *Foramina Optica* are also seen on the outside.

#### INTERNALLY.

**ELEVATIONS.** The *Posterior Clinoid Processes* stand upward and forward posteriorly.—Before them is situated the *Middle Clinoid Process*,—and on each side of that the *Anterior Clinoid Pro-*



cesses ;—these pass out laterally into the *Transverse Spinous Processes*,—and between these anteriorly is situated the *Ethmoidal Process*.

DEPRESSIONS. The *Ephipbium* or *Cella Turcica* is situated between its Clinoid Processes,—and on each side of that are the *Furrows* for the Carotid Arteries.

FORAMINA. Internally to the anterior clinoid processes are situated the *Foramina Optica*, for the transmission of the Optic Nerves and Ophthalmic Arteries.

## THE ALÆ.

### EXTERNALLY.

ELEVATIONS. The Alæ form on the anterior part of their external surface two processes. One turned toward the orbit is named the *Orbitar*—and the other toward the temple is the *Temporal*.—Posteriorly the Alæ run into a pointed process denominated the *Spinous*,—from which projects directly downward the *Styliform* process.

DEPRESSIONS. The Orbitar process is *depressed* for the orbit,—and the Temporal for the Temporal muscle ;—the anterior edge of the latter is *furrowed* for the passage of a nerve to the temporal muscle.—A deep *Depression* also exists between the temporal process and the pterygoid portion of the bone where the Pterygoideus externus arises.

FORAMINA. These more properly belong to its Internal part.

### INTERNALLY.

ELEVATIONS. None.

DEPRESSIONS. The whole internal surface of each ala is depressed to receive the middle lobes of the brain.

FORAMINA. The *Foramina Lacera* are situated between the upper part of the roots of the alæ and the transverse spinous process; they transmit the third, fourth, first branch of the fifth, and all the sixth pairs of nerves except a reflected twig which forms the commencement of the great sympathetic nerve; they also transmit the Ophthalmic vein to the cavernous sinus, and small arteries to or from the orbit.—The *Foramina Rotunda* situated immediately below them transmit to the upper Jaw the second branch of the fifth pair of nerves.—*Foramina Ovalia* situated posteriorly and somewhat externally to the last transmit to the lower jaw the third branch of the fifth pair of nerves, and a vein from the dura mater.—The *Foramina Spinosa* situated again posteriorly and externally to the last transmit into the cranium the arteria meningeæ media.

### THE PTERYGOID PORTIONS.

ELEVATIONS. Each of these portions consists of two plates. The *External Plate* is the broadest and externally gives rise to the External Pterygoid Muscle.—The *internal Plate* longest and surmounted at the top by a *Hook-like process*, over which passes the tendon of the tensor palati.

DEPRESSIONS. A *Furrow* at the inside of the root of these portions constitutes with the posterior orbital process of the palate bone a foramen for the transmission of an artery, vein and nerve to the nose.—A small *Hollow* at the posterior part of the root of the internal Pterygoid process gives origin to the Tensor palati,—and the cavity between the two pterygoid processes or the *Fossa Pterygoidea* affords rise to the Pterygoideus Internus.

FORAMINA. The base of the pterygoid portion is perforated from before backward by the *Foramen Vidianum*, which transmits an artery and vein to the nares, and returns a reflected

branch of the second branch of the fifth pair of nerves into the cranium to another foramen in the superior surface of the petrous portion of the temporal bone. This is the Vidian nerve.

#### ARTICULATION.

The body of the os sphenoides is joined posteriorly to the os occipitis by Synostosis, and to the temporal bones by its sinuous processes; anteriorly to the os ethmoides and os frontis by its body and transverse spines, to the os frontis and ossa malarum by its alæ, to the palate bones by its internal pterygoid plates, to the ossa maxillaria by its external pterygoid plates, and to the vomer by its processus azygos; and it is connected laterally to the parietal bones by its alæ. All these connexions take place by means of its own suture, except that with the processus azygos, which is by Schindylesis.

#### FŒTAL STATE.

In the fœtus, the alæ are separable from the body of the bone, which, at that period contains no sinuses.

#### USE.

To constitute a great portion of the base and some of the lateral part of the cranium, to contain the middle lobes of the cerebrum, to transmit numerous vessels and nerves, and to contribute to the formation of the orbits, &c.

### OS ETHMOIDÉS.

#### GENERAL DESCRIPTION.

The Ethmoid bone is situated in the middle of the anterior part of the base of the cranium. Its form is somewhat cubical, and it is divided into several portions, viz. a CRIBRIFORM

LAMELLA, a NASAL LAMELLA, two OSSA PLANA, CELLULÆ and two OSSA TURBINATA.

### PARTICULAR DESCRIPTION.

ITS CRIBRIFORM PORTION is situated horizontally, presents itself in the base of the Cranium, and is perforated with numerous Foramina for the transmission of the Olfactory or first pair of nerves.—Elevated from this, in a perpendicular direction, is a small process of the bone named the CRISTA GALLI, to which the origin of the Falx is attached.—The NASAL LAMELLA of the bone passes perpendicularly downward from the crista galli, and serves for the division of the cavity of the nares and partly for the expansion of the Olfactory nerve. On each side of the nasal Lamella, and at some little distance apart from it, are placed the OSSA TURBINATA of this bone for the expansion of the same nerve. These are named SUPERIORA in contradistinction to others hereafter to be mentioned. They are throughout cellular and foraminular, and on that account have been denominated SPONGIOSA. The CELLULAR PORTIONS of the bone are immediately external to those last mentioned. They constitute a portion of the Organ of Voice. The OSSA PLANA are the most external of all, and assist in composing the inner sides of the orbits. The upper edges of these plates contribute to form with the frontal bone two foramina in each orbit. These foramina are situated the one before the other in the Ethmoidal suture at this part. The one which, from its situation, is called FORAMEN ORBITARIUM INTERNUM ANTERIUS, transmits the nasal twig of the first or ophthalmic branch of the fifth pair of Nerves and a small branch of the ophthalmic artery. The FORAMEN ORBITARIUM INTERNUM POSTERIUS transmits merely a branch of the artery.

## FŒTAL STATE.

In a fœtus born at the usual time, neither the Crista Galli or the Nasal Lamella are ossified, and the bone is consequently divided into two portions.

## ARTICULATION.

The Ethmoidal Bone is connected to the Os Frontis, the Ossa Nasi, the Ossa Maxillaria Superiora, the Ossa Palati, and the Os Sphenoides, by the Ethmoidal suture, and to the Vomer by Schindylesis.

## USE.

The uses of this bone are partly to support the anterior lobes of the brain, to give attachment to the falx, to transmit the Olfactory nerves, to divide the nares, and to form a part of the orbits and of the Septum Narium.

## OSSA NASI.

The ossa NASI are situated in the arch of the nose. They are of an irregular figure, somewhat convex externally, and concave internally, narrow at their upper part, narrower still in the middle, but broadest at their base. Their roots and their anterior edges are thickest, the latter projecting in a spine inward to join the Septum Narium; their outer edges are depressed superiorly where they are overloped by the maxillary bones, and inferiorly where they overlope them; their lower edges are thin and irregular where the cartilage of the nose is attached.

## FŒTAL STATE.

In the fœtus these bones are proportionally shorter than in the adult.

## ARTICULATION.

These bones are superiorly, connected to the frontal bone, by the transverse suture; anteriorly, to each other, by the perpendicular Nasal Harmonia; externally, to the superior Maxillary bones, by the Oblique Nasal Harmoniæ; posteriorly, to the Septum Narium, by Schindylesis; and inferiorly, to the Cartilages of the nose.

## USE.

The use of these bones is to cover and defend the nares.

## OSSA LACHRYMALIA.

The OSSA LACHRYMALIA are situated at the anterior edge of the inner side of the orbits. Their external side consists of a flat surface, which is placed posteriorly, forming a part of the orbits; and a considerable groove anteriorly to contain the Lachrymal Sac. Their internal surface is exactly the reverse of this.

## FŒTAL STATE.

These bones in the fœtus considerably resemble those of the adult.

## ARTICULATION.

These bones are joined to the Os Frontis, Os Ethmoides and Ossa Maxillaria, by the Lachrymal Sutures which superiorly form a portion of the Transverse.

## USE.

The use of these bones is to form a part of the grooves for



the Lachrymal sacs and ducts, and also the anterior part of the inner sides of the orbits.

## OSSA MALARUM.

### GENERAL DESCRIPTION.

These bones, as their name indicates, constitute the prominences of the checks, and are of an irregular square form.

### PARTICULAR DESCRIPTION.

**ELEVATIONS.** That side of this bone which is most rough and irregular is attached to the *os maxillare superius*, and its inferior angle is called the *MAXILLARY PROCESS* of the bone.—The superior angle of the same side is named the *INFERIOR ORBITAL PROCESS*.—The edge of the bone externally to this projects backward, forming a part of the orbit, and is denominated the *INTERNAL ORBITAR PROCESS*.—Elevated from this, and still more externally is the *EXTERNAL ORBITAR PROCESS*, and—the lower posterior angle of the bone is named its *ZYGOMATIC process*.

**DEPRESSIONS.** These of this bone are two, viz. one on the internal orbital process, named *ORBITAR*, for the orbit, and—one behind the zygomatic process, named *TEMPORAL*, for the temporal muscle.

**FORAMEN.** There is generally only one considerable foramen in this bone, situated a little below the middle of its upper edge for the transmission of a nervous twig.

### FŒTAL STATE.

This bone is fully ossified in the fœtus of nine months.

## ARTICULATION.

This bone is joined at its posterior inferior angle, to the os temporis, by the zygomatic suture; its superior orbital process is connected, to the os frontis, by the transverse suture; its internal orbital process is connected, superiorly to the orbital process of the sphenoid bone, by a part of the sphenoid suture; and inferiorly, to the orbital process of the os maxillare superius, by the internal orbital suture, and its anterior edge is connected, to the same bone, by the external orbital suture.

## USE.

The use of this bone is to form the prominence of the cheek, to constitute a part of the orbit, to protect the temporal muscle, and, by its posterior edge, to give attachment to its aponeurosis, &c.

## OS MAXILLARE SUPERIUS.

## GENERAL DESCRIPTION.

This bone is situated at the inferior anterior part of the lower maxilla, and is of a very irregular form.

## PARTICULAR DESCRIPTION.

**ELEVATIONS.** The ALVEOLAR PROCESS of this bone is situated at its inferior edge for the purpose of containing the teeth of one side the upper jaw—The PALATINE PROCESS projects backward from the fore-part, and inward from the anterior portion of the lateral part of the last-mentioned process. Its use is anteriorly to form the arch of the palate and the floor of the nares—From the inner edge of the palatine process



stands upward a ridge denominated the *SPINOUS PROCESS*, to which the lower edge of the *septum narium* is fixed—From near the anterior part of the alveolar process there runs up, perpendicularly, the *NASAL PROCESS* of this bone, across the middle of the inner side of which a slight ridge passes to support the anterior end of the inferior turbinated bone, and at the upper extremity of its outer side arises the *orbicularis palpebrarum*—Immediately behind the nasal process of the bone is situated its great bulbous process, which posteriorly gives origin to a portion of the *pterygoideus externus*—The *ORBITAR PROCESS* of this bone is merely the upper surface of its bulbous process, from the anterior inner edge of which arises the *obliquus inferior oculi*—Externally to the bulbous process is situated the *MALAR PROCESS* of the bone.

**DEPRESSIONS.** The *PALATINE DEPRESSION* is on the lower side of its palatine arch—The *NASAL DEPRESSION* is on the upper side of the same arch—On the anterior part of the Alveolar process a small depression exists for the depressor *Labii superioris*, and—anteriorly between the Alveolar and Maxillary processes another considerable one for the origin of the *Elevator Labiorum communis* and *Elevator Labii superioris*—Immediately behind the Malar process is situated the *TEMPORAL DEPRESSION* of this bone for the temporal muscle—The concavity of the orbitar process is named the *ORBITAR DEPRESSION*, and—The posterior part of the nasal process is grooved for the Lachrymal Sac, and denominated the *LACHRYMAL DEPRESSION*.

**FORAMINA.** Of these two are proper and two common to this bone. Of the proper, the first is situated on the top of the bulbous process, and passes from the edge of its posterior to below the edge of its anterior part, being formed into a canal by the orbitar plate of the bone which passes over it;

this is the *INFRA ORBITARY FORAMEN*. It transmits to the cheek a branch of the second branch of the fifth pair of Nerves, and a small artery which is a branch of the internal maxillary.—The second foramen is that called *INCISIVUM*, situated immediately behind the middle Incisor Tooth. Superiorly this foramen is proper to each bone, but inferiorly the two form only one common to both bones. Through it a small artery, vein and nerve pass from the mouth to the nose.—One of the common Foramina is the great Fissure on the outer side of the orbit formed by this bone and the sphæmoid, and denominated *SPHÆNO-MAXILLARY*, transmitting twigs of arteries, veins, and nerves.—The other foramen, called 'Palatine, is common to this and the Palate bone, being formed by a fossa on the inner side of the back part of the bulbous process of this bone, and a corresponding one in the Palatine plate and nasal Lamella of the palate Bone, for the transmission of the Palatine artery and nerve.—The internal part of this bone also forms a great sinus called the *ANTRUM HIGHMORIANUM* which opens into the nares, between the two turbinated bones, by a narrow aperture.

#### FCETAL STATE.

In a fœtus of nine months, the orbital process, the Palatine process and the bulbous process of this bone are incompletely formed, and there are only four perfect and two imperfect sockets for the teeth. Instead also of the antrum there is nearly an oblong depression.

#### ARTICULATION.

The top of the nasal process of this Bone is joined to the *Os Frontis* by the Transverse Suture; the side of this process is joined to the *Os Lachrymale*, by the Lachrymal suture; the

anterior edge of this process is joined to the *Os Nasi*, by the oblique nasal suture; the *Os Maxillare* is also connected, by its malar process, to the *Os Malæ*, by the external orbital suture; by its orbital process, to the *Os Malæ*, by the internal orbital suture; by the inner edges of its orbital process, to the *Os Planum*, by part of the Ethmoid suture; by the back of its bulbous process, to the *Os Palati*, by the Palato-Maxillary suture; by the posterior edge of its Palatine process, to the *Os Palati*, by the Transverse Palatine suture; by its spinous process, to the Vomer, by Schindylesis; by the sockets of its Alveolar process, to the Teeth, by Gomphosis; by the inner edge of its Palatine process, to its fellow, by the longitudinal Palatine suture; between the anterior edge of the nares and the septum of the middle Incisor teeth, to its fellow, by the mystachial suture; and to the *Os Spongiosum inferius*, by the transverse nasal suture.

## USE.

The use of this bone is to form one half of the upper Jaw properly so called, to constitute a part of the nose, orbit, and Palate, to give origin to various muscles, transmission to nerves, &c.

## OS PALATI.

## GENERAL DESCRIPTION.

The Palate Bone is situated at the posterior part of the Palate, nares and orbit, and is a very irregular Bone. It may, however, be divided in four portions; namely, its PALATINE PROCESS situated at the posterior part of the arch of the palate;—its PTEREGOID PROCESS situated posteriorly and somewhat externally to the former;—its NASAL LAMELLA elevated

from the external edge of its Palatine portion, and passing up the sides of the posterior aperture of the nares; and—its ORBITAR PROCESSES, the ANTERIOR of which appears in the back part of the lower side of the orbit, and the POSTERIOR joins the base of the sphenoid bone.

### PARTICULAR DESCRIPTION.

ELEVATIONS. From the inner edge of its Palatine portion a ridge projects upward which is named its SPINOUS PROCESS; —the posterior end of this process is pointed backward, and gives origin to the azygos uvulæ; while the semicircular edge of the whole of this portion has attached to it the velum pendulum Palati.—About half way up on the inside of the Nasal Lamella, there exists a transverse ridge for the attachment of the posterior end of the inferior turbinated bone.

DEPRESSIONS. The PALATINE PORTION of this bone is depressed inferiorly for the palate and superiorly for the nares. —The Pteregoid portion has upon its posterior part three depressions, the middle one to the fossa Pterygoidea, and the lateral ones to receive the Pteregoid processes of the sphenoid bone.

FORAMINA. From the base of the Pteregoid process, several foramina pass upward into the foramen or more properly canal which we have already described as common to this bone and the superior maxillary;—and between the top of the posterior process and the body of the sphenoid bone another foramen is formed which has already been described.

### FCETAL STATE.

In the fœtus of nine months, the nasal plates of these bones are proportionally thicker than in adults, and the whole bone is tolerably complete.

## ARTICULATION.

The palate bone is joined, by the anterior edge of its Palatine Lamella, to the maxillary bone, by the transverse Palatine suture; by its Nasal and part of its orbital process, to the same bone, by the Palato maxillary suture; by its Pteregoid process and the posterior edge of its nasal lamella, to the Pteregoid portion of the sphenoid bone, by the sphenoid suture; by its orbital processes, to the Ethmoid bone, by the Ethmoidal suture; by the transverse ridge on its nasal lamella, to the inferior turbinated bone, by the transverse nasal suture; by its orbital process, to the body of the sphenoid bone, by the sphenoid suture; by the inner edges of its palatine lamella, to its fellow, by the longitudinal palatine suture; and by its spinous process, to the Vomer, by Schindylesis.

## USE.

The use of these bones is to form part of the palate, nares, and orbits, and of the maxillary, sphenoidal and ethmoidal sinuses.

## OSSA TURBINATA INFERIORA.

These bones exactly resemble the ossa turbinata superiora, except in this, that from the posterior part of their upper edges a thin broad process descends to cover a part of the antrum of the jaw; and from its anterior part a smaller one ascends to join the os lachrymale, and form some of the bony canal of the lachrymal duct.

## FÆTAL STATE.

These bones are tolerably complete, even in the fœtus.

## ARTICULATION.

They are joined to the ossa palati, ossa maxillaria, and ossa lachrymalia, by the transverse nasal sutures.

## USE.

Their use is partly to cover the antra, to assist in forming the lachrymal duets, and probably to give expansion to the olfactory nerve, although it has not yet been traced upon them.

## VOMER.

This is an azygos bone, placed in the middle of the nares, constituting the inferior posterior part of the septum, and of an irregular rhomboidal form. Thin as this bone is, it is composed of two lamella, which separating, leave a canal along its middle for the passage of an artery and vein. The posterior end of this bone where it joins the sphenoid is thickest, and its situation in the nares is not always perpendicular, but often inclined to one side.

## FŒTAL STATE.

In a nine month's fœtus, cartilage intervenes between the lamella of this bone, and they are consequently separable.

## ARTICULATION.

The anterior edge of this bone receives, in a furrow, the cartilage of the nose; its inferior edge is connected, by Schindylesis, to the spinous processes of the maxillary and palate bones, and its superior edge is connected, in the same way, to

the nasal lamella of the ethmoid and the processus azygos of the sphenoid bone.

## USE.

The use of this bone is to divide the nares, and to prop the arch of the palate.

## MAXILLA INFERIOR.

## GENERAL DESCRIPTION.

This consists of one bone containing sixteen teeth, is situated at the lower part of the face, and is divided into several portions; namely, the CHIN, situated anteriorly and limited by two small foramina; the SIDES extending from the foramina till the place where the bone turns upward, and the RAMI which constitute the posterior and superior portions of the bone; the inferior edge is denominated the base of the bone, and the points from which it turns upward are called its ANGLES.

ELEVATIONS. On the top of each Ramus are situated two processes; the Posterior is called CONDYLOID, and is articulated with the temporal bone—The anterior is named CORONOID, and has the temporal muscle inserted into it—On the outside of each angle a rough Protuberance gives attachment to the masseter—And on the inside of each another has the Pteragoideus internus fixed into it—An Elevated line passing internally from the base of the coronoid process to the commencement of the Chin gives origin to the Mylo-Hyoideus; and,—a corresponding one externally has the Buccinator fixed to it—Immediately behind the Symphysis of the Jaw a protuberance exists, to the upper part of which is attached the frænum of the tongue, to its middle part the Genio-Glossi,



and to its lower part the Genio-Hyoidei;—anteriorly, from the base of the Chin, on each side, is a considerable projection for the origin of the depressores Labii inferioris et Anguli oris.

DEPRESSIONS. Immediately before the condyloid process of each side, is a small depression, for the attachment of the Pteregoideus externus.—Upon each side of the anterior surface of the Chin the Bone is depressed for the origin of the depressores and Levatores Labii inferioris,—the base of the Chin is also depressed on each side for the insertion of the Digastrici.

FORAMINA. Those on each side the lower Jaw are two; the Posterior ones are placed on the inner sides of the rami, and transmit to the lower Jaw and its teeth the inferior maxillary artery, a branch of the third branch of the fifth pair of nerves, and return a vein.—A small canal frequently runs downward from the inner side of this foramen, transmitting, to the sublingual gland and the Mylo-Hyoideus, a branch of the nerve.—The other foramina are placed externally at the point which divides the Chin from the sides of the Jaw, they are the anterior openings of canals leading from the posterior ones, and transmit twigs of the artery and nerves which have not been expended within the Jaw.

#### FOETAL STATE.

In a fœtus of the full time, the lower Jaw is divided in the middle by a thin cartilage, and there are only five or six sockets for the Teeth.

#### ARTICULATION.

The lower Jaw is connected, by its condyloid processes, to the articular cavities of the temporal bones.



## USE.

The lower Jaw is essentially necessary in mastication, deglutition and speech.

## THE TEETH.

The Teeth are, in the Adult, thirty-two white and hard bodies, placed in the Alveolar processes of the Jaws.

## INTERNAL STRUCTURE.

All the Teeth are composed of two substances; an internal BONY SUBSTANCE of firmer texture than osseous matter usually is, and a cortex or ENAMEL which covers their greater extremity, and is of a much harder structure still. The enamel is thickest upon the tops of the teeth, and becomes gradually thinner toward their narrow part. The fibres of the enamel are all arranged around the tooth as radii from a centre, they are consequently perpendicular to the top of the Tooth, and horizontal around the sides, except that their points turn upward, leaving a convexity toward the narrow part of the tooth. The fibres of the bony part of the tooth run generally perpendicularly. In the middle of the bony substance of every tooth, a canal is left for the transmission of an artery, vein and nerve to each.

## EXTERNAL FORM.

Every tooth consists of a broad, thick part external to the socket, and covered by enamel which is denominated its HEAD or CORONA; of a narrow part immediately below this which is called its NECK or CERVIX, and of one or more smaller processes proceeding from the neck, sunk in the Jaw, and covered by Periosteum, which are named their ROOTS or FANGS.

## CLASSES OF THE TEETH.

The teeth are generally divided into three classes, viz. INCISORES, CANINI and MOLARES. The two first Molares have been termed Bicuspides, and the last on each side has been called DENS SAPIENTIÆ—The INCISORES are four front teeth in each Jaw; they have a sharp cutting edge, and, by their foreside being turned inward, while they are sloped out behind, they considerably resemble the form of wedges. The two middle incisores of the upper Jaw are always much broader than the lateral ones, or than those of the under Jaw; but the lateral ones of the under Jaw are slightly larger than the middle ones—The CANINI are one on each side the incisores in both Jaws. These are larger than the incisors, and are not edged, but pointed, not adapted to cutting, but to piercing or tearing—The MOLARES have all large crowns or heads; those of the two anterior in each side of both Jaws have two points whence they derive their name of BICUSPIDES. The two succeeding Molares in each side of both Jaws have the largest heads of any; and in the lower Jaw have two, in the upper three roots; the last on each side, denominated DENS SAPIENTIÆ, has not so large a base as the third or fourth, nor has it so many roots.

## OF THE FORMATION OF THE TEETH.

In the fœtus of three or four months, are discernible four or five pulpy substances, contained in the commencement of the Alveoli. All these pulps are firm, semi-transparent, and supplied with numerous vessels from the bottom of the Alveoli. They are also loosely enveloped in thin capsules, separable into two membranes, the external of which is highly Vascular, and between this membrane and the pulp there is a small portion

of fluid.—Ossification commences on the pulp itself before it has attained the size of the body of the tooth, either in one or in more points, according to the form of the class to which the individual tooth may belong. When these points of ossification are two or more upon one pulp, they gradually unite, and, compressing the pulp by the formation of the neck, it is gradually pushed outward, and a fang is formed over it. The Socket now conforms itself to the shape of the fang, and each of these is perforated with a small canal which passes into the cavity in the body of the Tooth. During all this period the Capsule has been merely connected to the neck of the Tooth, and has but loosely covered its body. From this Capsule the enamel is secreted, but it is subsequent in formation to the bony part of the tooth. The capsule gradually wastes when the enamel is secreted, and as the tooth is formed.

In the young Jaw the Bicuspidæ are omitted, and there are only four molares in each Jaw; the teeth are consequently twenty in number. About two years of age, they make their appearance through the gums; about seven, they begin to be shed; and about fourteen, they are completely shed, and the number of the adult teeth is increased. This shedding is occasioned by the absorption of the fangs of the first set, and the decay of their sockets.

#### ARTICULATION.

The teeth are articulated to the Alveolar processes of the Jaws by Gomphosis.

#### USE.

The Teeth are the instruments of Mastication, and are subservient to the pronounciation of sounds.

## OSTEOLOGY.

## OF THE BONES OF THE TONGUE AND LARYNX.

## OS HYOIDES.

The Os Hyoides is situated horizontally between the base of the Tongue and the top of the Larynx, and is divided into a BODY, two CORNUA, and two APPENDICES.

## BODY.

The body of this bone is its broad anterior part, which is somewhat convex anteriorly and concave posteriorly. Its anterior convexity is divided by a MIDDLE HORIZONTAL RIDGE. Into the space above the ridge the Genio Hyoidei and the Basio-Glossi on each side of them are inserted; into the ridge itself the Mylo-Hyoidei and the Stylo-Hyoidei on each side of them are fixed; and into the surface below the ridge the Sterno-Hyoidei, and on each side of them the Coraco-Hyoidei are attached. To its upper edge the ligaments and membranes of the Epiglottis, Tongue, and Thyroid Cartilage, are fixed, and its posterior concavity receives the Thyroid when they are approximated.

## CORNUA.

The CORNUA stretch slightly outward and then considerably backward from the body. Their two flat sides are neither placed perpendicularly nor horizontally, but sloped from above

downward and outward. The cornua gradually diminish as they extend from the body, and terminate in round tubercles tipped with Cartilage, from which Ligaments proceed to the superior Cornua of the Thyroid Cartilage. From the upper edge of the external surface of each Cornu, the Cerato-Glossus arises, and from the under edge, the Hyo-Thyroideus. To its posterior side the membranes of the Tongue and Larynx adhere.

#### APPENDICES.

These bodies project upward from the bone at the junction of its body and Appendices. Into them the Stylo-Hyoidei Alteri are inserted, and the Chondro-Glossi arise from them; a ligament is also extended from them to the Os Hyoides.

#### FÆTAL STATE.

In the fœtus this bone is wholly cartilaginous, except a point which is generally ossified in the middle of its body.

#### ARTICULATION.

The Os Hyoides is connected by Ligaments to the Styloid processes, and to the Cornua of the Thyroid Cartilage.

#### USE.

The use of this bone is to serve as a solid point on which the muscles arising from or inserted into it may act.

## OSTEOLOGY.

### OF THE BONES OF THE TRUNK.

The Trunk consists of the SPINE, the PELVIS, and the THORAX.

#### *THE SPINE.*

The SPINE consists of the long Chain of bones extending from the head to the lower part of the body, and resembling two unequal Pyramids joined by a common base. The superior Pyramid has its apex upward, retires somewhat superiorly, advances a little below that, again retires in the cavity of the Chest, and again advances in that of the Abdomen, where it is joined by the lesser pyramid with its apex downward, and retiring backward for the enlargement of the Pelvis. The upper long pyramid contains the TRUE, the inferior short one the FALSE VERTEBRÆ.

#### *CLASSES OF THE TRUE VERTEBRÆ.*

These are twenty-four in number; seven of them being CERVICAL, twelve DORSAL, and five LUMBAR.

#### GENERAL DESCRIPTION.

All the Vertebrae possess a round body flatted above and below for articulation with its fellows;—a bony RING posterior to their bodies which transmits the Spinal Marrow; and—seven PROCESSES projecting from the sides of the ring. Of

these processes four are ARTICULAR, and three for MUSCULAR ATTACHMENT. The four articular are also named OBLIQUE, two of them being situated superiorly and two inferiorly, and all of them covered by smooth Cartilage. Of the three for muscular attachment two project laterally and are called TRANSVERSE, and one projecting posteriorly is denominated SPINOUS.

### PARTICULAR DESCRIPTION.

#### CERVICAL VERTEBRÆ.

The Cervical or seven uppermost Vertebræ are smaller and flatter anteriorly than the rest; they are also flat posteriorly; hollowed superiorly from side to side, and inferiorly from behind forward. The cartilages between their bodies are considerably thick;—their OBLIQUE PROCESSES are more truly oblique than those of the other Vertebræ; the superior ones facing somewhat backward, and the inferior ones forward.—Their TRANSVERSE PROCESSES are double, arising, not only from between the oblique processes, but also from the body of each, and leaving between them a foramen for the transmission of the cervical artery and vein. Their upper sides are hollowed for the passage of Nerves from the spinal canal, and their points are bifurcated for the attachment of Muscles.—Their SPINOUS PROCESSES are also bifurcated, stand nearly straight backward, and are shorter than those of the rest.

#### DORSAL VERTEBRÆ.

These are of a middle size, between the cervical and Lumbar. Their BODIES are convex anteriorly, and flattened laterally



by the heads of the ribs which are attached to their sides; they are also more concave posteriorly, and the Spinal canal in them is perfectly round. Their superior and inferior surfaces are horizontal, and the cartilages interposed between them thinner than those of the rest, and thinnest of all at their anterior part, which contributes to cause the concavity of the Thorax.—Their OBLIQUE PROCESSES are nearly perpendicular; the upper ones turning backward, and the lower ones forward.—Their TRANSVERSE PROCESSES are long, turned backward, and thick at their extremities, which have anteriorly a depression for the tubercles of the ribs.—Their SPINOUS PROCESSES are long, sloping downward, pointed at their extremities, ridged above and furrowed below.

#### LUMBAR VERTEBRÆ.

These are larger than any of the rest. Their BODIES are circular anteriorly, flattened behind and somewhat concave above and below. The cartilages interposed between them are thicker than any of the rest, and thickest anteriorly, which contributes to cause their convexity in the Abdomen.—Their OBLIQUE processes are perpendicular, the superior ones turning inward, and the inferior ones outward.—Their TRANSVERSE PROCESSES are long and slightly turned backward.—Their SPINOUS PROCESSES are strong, flat on each side, and project horizontally backward. The spinal canal in them is nearly triangular.



EXCEPTIONS TO THE PARTICULAR DESCRIPTION  
OF THESE CLASSES.

## THE ATLAS

Has neither body or spinous process, but merely constitutes a bony arch, behind the anterior part of which is a smooth hollow surface which moves on the tooth-like process of the following Vertebra, and into its posterior part the recti Postici Minores are fixed, and the ligaments connecting this Vertebra with the following one—The SUPERIOR OBLIQUE PROCESSES are large, oblong, and hollowed toward the middle of their internal edge. Around the posterior end of these processes are the grooves for the entrance of the vertebral arteries, and the Exit of the tenth pair of nerves—Its INFERIOR OBLIQUE PROCESSES are large, circular, slightly concave, and sloping upward and inward. Its TRANSVERSE PROCESSES are neither grooved superiorly, or bifurcated at their ends, but they project beyond those of the other Vertebrae, in order to give attachment to the muscles which rotate the head. The spinal foramen is large in it.

## THE DENTATA

Has a Pyramidal shaped BODY, the upper part of the Pyramid forming a TOOTH-LIKE PROCESS which is smooth anteriorly for articulation with the cavity on the Posterior side of the anterior arch of the Atlas, and also smooth posteriorly for the transverse Ligament of these Vertebrae.—The sides of this process give out Ligaments which are called LATERAL, and are

fixed into a small tuberosity on each side of the cavity of the Atlas, and into the Os Occipitis immediately before its condyles—Its tip also gives out a Ligament called PERPENDICULAR, which is fixed to the foramen Magnum between the two Condyles—The SUPERIOR OBLIQUE PROCESSES of this Vertebra correspond to the inferior oblique of the Atlas, and its INFERIOR OBLIQUE PROCESSES resemble those of the other cervical Vertebrae—Its TRANSVERSE PROCESSES are short, not hollowed, or bifurcated, but form a sort of canal permitting a curve of the vertebral arteries—Its SPINOUS PROCESS is short and strong, and gives origin to the Recti Majores Postici and the Obliqui Superiores capitis.

#### THE LAST CERVICAL VERTEBRA

Differs from the rest, in having large transverse processes which are not bifurcated, neither is it spinous, and it, upon the whole, more resembles the Dorsal Vertebrae.

#### FIRST DORSAL VERTEBRA,

Besides having in its lower edge half of the depressive for the second rib, has, on its upper edge, the whole of the depression for the first.

#### ELEVENTH AND TWELFTH DORSAL VERTEBRÆ.

The first of these has frequently the whole of the depression for the Eleventh rib, and is without the articular surface on its transverse process; the latter always receives the whole of the twelfth rib, and is destitute of the articular surface: both of them approximate in form to the Lumbar.

## THE FIRST LUMBAR VERTEBRA

Has a short transverse process to prevent its interference with the motions of the last rib.

## THE FIFTH LUMBAR VERTEBRA

Has also short transverse processes to prevent its interference with the spine of the Ilium. Its spinous process too is short.

*THE FALSE VERTEBRÆ*

Consist of two bones, the *OS SACRUM* and *OS COCCYGIS*.

*OS SACRUM.*

This bone resembling a pyramid with its apex reversed, is convex posteriorly for the attachment of Muscles, and concave anteriorly for the reception of the Pelvic Viscera. On its concave surface four elevated transverse lines point out its separation in the fœtus into five distinct portions, from which the term of False Vertebrae is derived. This anterior surface is flat; posteriorly, the body of the bone is also flat, and behind it the Spinal Canal, which is of a triangular form, rapidly diminishes.—Of *OBLIQUE PROCESSES* the *Os Sacrum* has only two, projecting backward and turning inward from the upper part of its first portion; to these are connected the last Lumbar Vertebrae. Descending in a line from these, and analogous to Oblique processes for the inferior portions, several protuberances stand out from which the *Multifidus Spinæ* arises.—Its *TRANSVERSE PROCESSES* form one oblong mass, each side of which are laterally marked by a double articular surface for connection with the rest of the Pelvis. The anterior of these two surfaces is connected by cartilage, the posterior merely by

ligaments.—The transverse processes of the two last portions contribute nothing to this, but posteriorly give rise to the sacrosciatic ligaments.—The three superior portions of the bone have SPINOUS PROCESSES; the two inferior portions have none, or at least they do not meet to form a spine.

DEPRESSIONS and FORAMINA. Immediately before the oblique processes of the bone are FURROWS, through which pass the twenty-fourth pair of Spinal Nerves, and, below the spinous process of the last portion on each side, the twenty-ninth pair of nerves pass.—The anterior surface of the bone is marked by four great foramina on each side called INTERNAL SACRAL, which transmit the twenty-fifth, twenty-sixth, twenty-seventh, and twenty-eighth pairs of nerves. The four foramina on each side of the posterior part of the bone called EXTERNAL SACRAL transmit merely a few filaments of Nerves, arteries, and Veins.

#### FŒTAL STATE.

Each of the bones that compose the Os Sacrum consist of a body and two lateral portions, in the fœtus connected by cartilage.

#### ARTICULATION.

This bone is articulated above to the last Lumbar Vertebra in the usual way, and below to the Os Coccygis. Laterally it is connected to the Ossa Innominata in the way already mentioned.

#### USE.

The use of this bone is to form a basis for the superior part of the Trunk, to form the back part of the pelvis, and to give attachment to muscles and transmission to nerves.

## OS COCCYGIS

Is of a Pyramidal form; its base being turned to the Apex of the Sacrum. It consists of four portions, and is concave anteriorly and convex posteriorly. The superior of its four portions is the largest, and extends laterally somewhat beyond the last portion of the sacrum. From the upper posterior part of this portion small processes rise which join the last spines of the sacrum, and, immediately below its SHOULDERS or lateral projections, a FURROW transmits the thirtieth spinal pair of Nerves. The inferior portions of the bone gradually diminish as they descend. To these bones the Coccygei, the Levatores Ani, the Glutei Maximi, and the Curvatores Coccygis are attached.

## FŒTAL STATE.

In the fœtus, these bones are not ossified, and are even in young persons distinct, from the intervention of Cartilage between them.

## ARTICULATION.

The Os Coccygis is articulated to the last portion of the sacrum.

## USE.

The use of this bone is to sustain the Pelvic Viscera, &c.

## THE THORAX

Is somewhat of a conoidal form, consists of twelve Dorsal VERTEBRÆ behind, twelve RIBS on each side, and the STERNUM before.

## RIBS.

## GENERAL DESCRIPTION.

The Ribs are the long semicircular bones extending from the Vertebrae posteriorly, toward the Sternum anteriorly, and forming considerably more than the lateral parts of the Thorax. Some of them only are directly articulated to the sternum, and these are denominated TRUE RIBS, while the others are called FALSE. The first class consists of *seven*, the second of *five*.

The Ribs are concave internally, and convex externally; their upper edges are rounded; while the inside of their lower edges is depressed, about the middle by the passage of the intercostal Arteries, Veins, and Nerves; to both edges the intercostal muscles adhere.—That end of them which is connected with the Vertebrae is termed their HEAD, and is divided into two concave surfaces by a middle elevated ridge. The concavities are attached to the edges of the bodies of two Vertebrae, while the ridge passes into the Cartilage between them.—At a little distance from this, a second articular surface is formed upon the posterior part of the bone, denominated its TUBERCLE, for connection with the transverse process of the lowest of the two Vertebrae to which its head is attached. And near both of these articular surfaces are several elevations for ligaments, and depressions for Mucous Glands.—External to this the ribs are flattened by the Sacro-Lumbalis, which is inserted at the extremity of this flat surface, named its *angle*, from which the ribs turn forward.—From the angle to the anterior termination of the Ribs, their external surface is tolerably flat, and their extremities, some-

what enlarging, form a concavity for the reception of the Cartilage, by which they are either articulated to the sternum or connected with each other. These cartilages make a considerable turn upward to the Sternum.

### EXCEPTIONS TO THE GENERAL DESCRIPTION OF THESE BONES.

The sides of the FIRST RIB are situated perpendicularly, not horizontally, one edge turning inward and the other outward;—it has only one articular surface upon its head, because it is connected to the body of only one Vertebra;—The cartilage of its other extremity is generally ossified in Adults, and joined at right angles to the Sternum;—On its inferior edge there is no groove for intercostal vessels;—Near its sternal end a rough tuberosity gives attachment to the *Scalenus Anticus*, and—removed from this, toward the middle of the same upper side, another protuberance gives attachment to the *Scalenus Medius*.

The SECOND RIB also has something of the horizontal position, and—a protuberance on its upper side for the *Scalenus posticus*;—but has very little groove on its inferior edge for the intercostal Vessels.

The ELEVENTH RIB has no articular surface for attachment to the transverse process of the vertebra, but is merely fixed by Ligaments; the fossa for the intercostal Vessels is very slight in its lower edge, and—it becomes smaller towards its sternal end.—Its Cartilage also is but loosely connected to the Cartilage of the tenth rib.

The TWELFTH RIB is short, and less curved than the rest;—



its head is articulated with the body of only one Vertebra;—it has no connection with any transverse process;—no fossa is observable on its lower edge;—its anterior end diminishes, and is tipped with a small cartilage.

#### FŒTAL STATE.

In the fœtus, the heads and tubercles of the ribs, as well as a great proportion of their sternal ends, are cartilaginous.

#### ARTICULATION.

The Ribs are articulated, posteriorly, to the bodies and the transverse processes of the Dorsal Vertebrae, and anteriorly to the Sternum or to each other.

#### USE.

The use of these bones is to form a great portion of the Thorax, to defend the Thoracic Viscera, and to give attachment to numerous muscles, while they permit all the movements necessary in respiration, &c.

## STERNUM.

#### GENERAL DESCRIPTION.

The Sternum, or breast bone, consisting of three portions, is situated in the anterior part of the Thorax; it is broadest above and narrower below; somewhat concave internally for the attachment of the Mediastinum, and convex externally for the attachment of muscles. Of its positions, the two inferior, and sometimes even the superior, are connected by osseous matter.



## PARTICULAR DESCRIPTION.

**FIRST PORTION.** This portion of the bone is thick and broad above, narrower and thinner below; the posterior part of its upper end is somewhat concave, for the passage of the Trachea;—and the lateral parts of the same end are depressed for the attachment of the Clavicles.—External to these depressions, the bone is rough where the Sterno-Cleido-Mastoidæ arise—at the upper part of each side the bone is depressed for the attachment of the first Rib, and—at the lower part of each side may be seen half of the depression for the second rib.

**SECOND PORTION.** This is the longest portion of the bone: it is of equal thickness throughout, but is somewhat broader below than above—Each side of it has distinct depressions for half the second Rib, all the third, fourth, fifth, sixth, and half the seventh Rib.

**THIRD PORTION.** This is the smallest of all, and, being generally cartilaginous in young subjects, it has been denominated *ARTILAGO XIPHOIDES* or *ENSIFORMIS*; it has upon the upper part of each side a depression for articulation of half the seventh rib.

## FŒTAL STATE.

In the fœtus, the first and second portion of this bone have but a few points of Ossification in them, and the last one is altogether Cartilaginous.

## ARTICULATION.

The Sternum is attached to the Clavicles at its upper part, and laterally to the seven true ribs.

## USE.

Its use is to defend the Heart and Lungs, to give attachment to the Mediastinum and to several muscles, and to serve for articulation with the ribs.

*THE PELVIS.*

The Pelvis is a sort of double basin, situated at the lower part of the Trunk, and formed posteriorly by the Os Sacrum and Os Coccygis, which have already been described, and laterally and anteriorly, by the Ossa Innominata which are now to be examined.

*OSSA INNOMINATA.*

These great bones forming the lateral and anterior parts of the Pelvis, consist of three portions in the young subject, and are consequently described, even in the adult, as composed of three distinct bones, viz. the OS ILIUM, OS ISCHIUM and OS PUBIS.

*OS ILIUM.*

This is the largest of the three portions, and is situated superiorly and posteriorly to the rest;—Its posterior external surface is unequally convex, and has been denominated its DORSUM; Its internal anterior surface is unequally concave, and has been denominated its VENTER;—The semicircular top of the bone is termed its CRISTA, and to it are attached anteriorly the oblique and transverse Abdominal Muscles, and posteriorly

the *Quadratus Lumborum* and *Latissimus Dorsi*;—The anterior end of the *Crista* is denominated the *ANTERIOR SUPERIOR SPINOUS* process of the bone, to which are attached the *Sartorius*, the *Tensor Vaginæ Femoris*, and *Poupart's Ligament*.—About an inch and a half below this is situated another projection of the bone, called its *INFERIOR ANTERIOR SPINOUS PROCESS*, from which arises the *Rectus Cruris*.—The posterior end of the *Crista* is termed the *SUPERIOR POSTERIOR SPINOUS PROCESS*, which externally has attached to it Ligaments from the *Lumbar Vertebræ*, and internally gives origin to the *Sacro-Lumbalis* and *Longissimus Dorsi*:—About an inch below this another projection of the bone is called its *INFERIOR POSTERIOR SPINOUS PROCESS*, by which internally it is articulated to the *Os Sacrum*, and externally gives origin to some fibres of the *Pyriformis*;—Immediately under this process there is a great notch of the bone, which forming, in the recent subject, a foramen, by the passage of a ligament below it, transmits the *Pyriformis*, the great *Sciatic nerve*, and the posterior *Crural Vessels*;—The whole external margin of the *Crista* gives rise to the *Gluteus Maximus*;—And lower down upon the *Dorsum* of the bone, a ridge extends from its anterior superior spinous process to the *Sciatic notch*, from which the *Gluteus Medius* arises;—Another ridge extends from above its anterior inferior spinous process toward the same notch, from which the *Gluteus Minimus* arises;—Immediately below this the bone becomes extremely thick, and contributes to form something less than two-fifths of the great *ACETABULUM* or cavity for receiving the head of the *Femur*. The *Venter* of the *Os Ilium* gives origin to the *Iliacus Internus*, and a considerable furrow leading downward from it gives passage to its tendon, and that of the *Psoas Magnus*;—The concavity of the *Venter* is limited inferiorly by a sharp ridge which divides the upper

from the lower Pelvis, and into which the Psoas Parvus is inserted;—That portion of the internal surface of the Ilium which is posterior and inferior to this, is divided into three distinct surfaces, the anterior of which is connected by Cartilage to the Sacrum, the middle one tied to it by Ligaments, and the posterior one as was already mentioned, gives origin to the Sacro-Lumbalis and Longissimus Dorsi.

#### FÆTAL STATE.

Of this bone the Crista superiorly, and its Acetabular portion inferiorly, are cartilaginous in the fœtus.

#### ARTICULATION.

Posteriorly this bone is connected to the Os Sacrum, and anteriorly it is connected to the two following Bones in the Acetabulum.

#### USE.

The use of this bone is to form the lateral and superior part of the Pelvis, to give attachment to numerous muscles of the Trunk and of the lower extremity, to support the Abdominal Viscera, and to form a part of the socket for the head of the thigh bone.

### OS ISCHIUM.

This bone is next in size to the Os Ilium, and forms the posterior inferior part of the Os Innominatum;—Its upper part is extremely thick and irregular, and contributes above two-fifths to the Acetabulum;—from the superior part of its upper portion there projects backward a small process called its SPINE, from which arises the Coccygeus and Levator Ani in-

ternally, the superior Gemellus externally, and the lesser Sacro-Sciatic Ligament between them;—Below this process a depression of the bone serves as a pulley, round which the Tendon of the Obturator Internus plays;—The Piriformis depresses the portion of the bone above its spine;—Below the Groove of the Obturator, is situated the GREAT TUBEROSITY of the Ischium, its external edge giving rise to the Quadratus Femoris, its internal to the Inferior Gemellus—Between these edges, on the upper part of the Tuber, are two oblique depressions, the external or superior one giving rise to the Semi-Membranosus, and the internal or inferior giving origin to the Semi-Tendinosus and the long head of the Biceps;—Immediately below this the tuberosity gives rise to the great head of the Triceps toward its outer part, and forms the bump on which we sit at its inner part;—The portion of the bone which advances forward and upward from this, is termed its RAMUS, from the inferior edge of which arise the Transversalis and Erector Penis, and the other two heads of the Triceps.

## FŒTAL STATE.

In a fœtus of nine months the Acetabular portion of this bone, its spine, its tuberosity, and its ascending Ramus, are cartilaginous.

## ARTICULATION.

This bone is connected superiorly to the Os Ilium and Os Pubis, in the Acetabulum; inferiorly and anteriorly, it is connected to the descending Ramus of the Os Pubis.

## USE.

This bone forms the Tuberosity on which we sit, contributes a great deal to the Acetabulum, gives origin to numerous

muscles, and constitutes the inferior posterior part of the Pelvis.

## OS PUBIS.

This bone is situated in the anterior part of the Pelvis, and is less than the two last described;—This bone contributes about one-fifth to the Acetabulum, which is its thickest portion;—advancing forward from this, it terminates in an ANGLE, to which the Rectus and Pyramidalis Abdominus, and the anterior end of Poupert's Ligament, are attached; between this and its Acetabular portion a ridge internally limits the Pelvis, and externally a spine gives origin to the Pectinalis.—From its angle the bone turning downward joins, by its descending RAMUS, the ascending Ramus of the Ischium, between the two and the Acetabulum forming the great foramen called THYROIDEUM OR OBTURATORIUM, which, nearly filled in the recent subject by Ligament, gives origin externally to the Obturator Externus, and internally to the Obturator Internus, and transmits the Obturator Artery and Vein, and the posterior Crural Nerve.—The anterior edge of the descending ramus of the Pubis gives origin to the upper heads of the Triceps, and in some measure to the Gracilis.

### FŒTAL STATE.

In the fœtus at birth the whole of this is cartilaginous, except a small part of its greater end.

### ARTICULATION.

Posteriorly, this bone joins the other two in the Acetabulum; and, inferiorly, is connected to the ascending Ramus of the Ischium.

## USE.

Its use is to form the anterior part of the Pelvis and a portion of the Acetabulum; anteriorly, to support the Abdominal Viscera, and to give origin to several muscles.

*THE ACETABULUM.*

The portions which the different bones contribute to the formation of this cavity have been mentioned in the description of each. Its brims are highest superiorly and posteriorly; but there is a considerable depression in them inferiorly, over which a Ligament passes in the recent subject; and the whole middle and inferior portion of the cavity is depressed and uncovered by cartilage for the attachment of the round Ligament of the joint and the lodgment of the Synovial Gland.



## OSTEOLOGY.

### OF THE BONES OF THE UPPER EXTRE- MITIES.

The bones of the upper extremities are divided into those of the SHOULDER, the ARM, the FORE-ARM, and the HAND.

#### *BONES OF THE SHOULDER.*

These are two in number, viz. The CLAVICLE and the SCAPULA.

#### CLAVICULA.

The Collar bone passes horizontally between the top of the sternum and that of the shoulder.—This bone is largest at its extremities. Its sternal end is triangular, and from its posterior angle the interclavicular ligament passes to its fellow behind the Sternum;—The inferior side of this end is marked by a small surface where it joins the first rib, and its upper side gives rise to a portion of the Sterno-Cleido-Mastoideus.—The bone then bends forward, its anterior edge giving rise to the Pectoralis Major—from about this part, its inferior side is marked by the insertion of the Sub-Clavius till within an inch and a half of its Scapular end.—About its middle the bone begins to turn backward; and, towards its external end, again to turn forward; at this part the bone is flat above and below—anteriorly giving rise to the Deltoid, and —posteriorly to

the Trapezius—Its inferior surface being marked by the Trapezoid and Conoid Ligaments from the Scapula, and—its sternal termination being horizontally oblong and smooth.

#### FOETAL STATE.

This bone is very perfect in the fœtus.

#### ARTICULATION.

Internally it is connected to the Sternum, and externally to the Scapula.

#### USE.

The use of these bones is to prevent the Shoulders falling forward, to protect the Vessels passing to the neck and upper extremities; and to give origin to several muscles.

### SCAPULA.

The Shoulder blade is the triangular bone situated partly behind the sides of the upper part of the Thorax, and forming the greatest part of the Shoulder—Its posterior side is termed its DORSUM and its anterior its VENTER;—Its upper edge is termed its SUPERIOR COSTA, its lower edge its INFERIOR COSTA, and its inferior edge its BASE.—Its angles are also three: a superior and inferior, and an anterior;—Its processes are of the same number.—The first, denominated its SPINOUS PROCESS, arises from near the upper part of its base, and horizontally along the upper part of its Dorsum;—The origin of this Spine is depressed by the Trapezius, its upper edge has that muscle inserted into it, and the anterior half of its lower edge gives origin to a portion of the Deltoid;—The second process of the bone arises from the Spinous process, and, becoming very flat, it

covers the top of the Shoulder, and is named **ACROMION**. Its inferior and anterior edge gives attachment to a portion of the Deltoid, while the Clavicle is attached to a smooth depression on its upper edge; by being considerably elevated above the shoulder and joint, it at once permits its motions and defends it.—The third process of the Bone arises from the upper part of its anterior angle, and then turns forward, the tuberosity at its root giving rise to the Trapezoid and Conoid Ligaments, and its tip giving rise to three muscles, namely, The Pectoralis Minor internally, the short head of the Biceps Cubiti externally, and the Coraco-Brachialis inferiorly. Behind the anterior angle the bone contracting forms a **NECK** or **CERVIX**, which superiorly is notched to transmit the Supra Scapular Vessels, and from the ligament crossing it the Omo-Hyoidcus arises, and inferiorly is rough for the origin of the long head of the Triceps Cubiti;—This angle is depressed into a **GLENOID CAVITY** anteriorly for the reception of the head of the Humerus; and, from the edges of the Cavity, the Capsular Ligament of the joint proceeds;—Its upper margin is also depressed for the origin of the long head of the Biceps Cubiti.—The Dorsum of the Bone above the Spine gives rise to the Supra Spinatus, and, below the Spine, to the Infra Spinatus;—From its Venter arises the Subscapularis;—Its superior angle has inserted into it the Angularis; and, over its inferior angle, passes the Latissimus Dorsi;—The base of the bone has attached to it, above the Spine, the Rhomboideus Minor, and, below it, the Rhomboideus Major;—Its internal edge gives origin to the Serratus Anticus.—The inferior Costa of the Bone is marked by two Longitudinal depressions, from the external of which arises the Teres Minor, and from the internal a portion of the Subscapularis.

## FŒTAL STATE.

In the fœtus of nine months, the anterior angle or head of the Scapula, its coracoid process, its acromion and its base are all cartilaginous.

## ARTICULATION.

This bone is articulated to the Clavicle, by the upper side of the Acromion; and to the Humerus, by its Glenoid Cavity.

## USE.

The use of this bone is to defend the Thorax posteriorly, to give attachment to numerous muscles, and to afford a fulcrum for the

*BONE OF THE ARM.*

## OS HUMERI.

The Bone of the Arm is long, cylindrical and straight. It may be divided into a superior and inferior EPIPHYSIS and a middle DIAPHYSIS. We shall therefore describe it as well as the other long bones in that order, commencing with its

## SUPERIOR EPIPHYSIS.

This portion of the bone has, superiorly, a round flat HEAD, from the edges of which arise the capsular ligament, connecting it to the Glenoid Cavity of the Scapula—The portion of the Epiphysis immediately below this is named its CERVIX, although it is scarcely at all contracted.—Upon the anterior part of this Epiphysis are two GREAT TUBEROSITIES; the internal or less giving attachment to the Subscapularis, and the

external or greater having upon it three distinct surfaces, into the internal of which the Supra Spinatus is inserted, into the external the Teres Minor, and into the middle the Infra Spinatus.—Between these two tuberosities a great GROOVE is situated, through which passes the tendon of the long head of the biceps cubiti: this groove is continued down upon the anterior part of the

### DIAPHYSIS.

Upon each side of the continuation of the groove a considerable ridge appears; the external having inserted into it the Pectoralis Major, and the internal giving attachment to the Latissimus Dorsi and Teres Major.—Opposite to this upon the posterior side of the Diaphysis, a ridge gives origin to the second head of the Triceps —About the middle of the external side of the Diaphysis, a great tuberosity gives insertion to the Deltoid; immediately below it arises the Brachialis Internus; and the depression external to its inferior end transmits the Musculo-Cutaneous nerve and the vessels that accompany it; —Precisely opposite to this depression, upon the inner side of the bone, a rough protuberance gives attachment to the Coraco-Brachialis and origin to the inter muscular Ligament;—Exactly between this ridge and the last mentioned depression, upon the anterior flat surface of the bone, the foramen for the Medullary Artery is seen slanting downward.—Below this the Diaphysis becomes more flat, and has a ridge on its external and internal edge;—that on its external edge is the most considerable, and gives rise superiorly to the Supinator Radii Longus; and inferiorly to the Extensor Carpi Radialis Longior. From this commences the

## INFERIOR EPIPHYSIS.

Upon this the same ridges are continued, the external one partly giving rise to the Extensor Carpi Radialis Brevior; and the internal, to the Pronator Radii Teres;—these ridges terminate in the external and the internal **CONDYLES**.—From the external Condyle arises a part of the extensor carpi Radialis Brevior and of the Supinator Radii Brevis, but nearly the whole of the Extensor Digitorum Communis, the Extensor Carpi Ulnaris and the Anconeus.—From the internal, which is more protuberant, arise the Palmaris Longus, the Flexor Digitorum Sublimis, the Flexor Carpi Ulnaris, the Flexor Carpi Radialis, and part of the Pronator Radii Teres.—Between these two Condyles is situated the Trochlea or Pulley of the Humerus; the external round nob of which is received by the head of the Radius, while its internal portion, consisting of a middle depression with lateral risings, is connected to the Sigmoid Cavity of the Ulna.—The capsular ligament of the joint arises around this Trochlea.—Immediately above the trochlea, both before and behind, the middle of the Epiphysis is depressed;—the slight anterior depression receives the coronoid process of the Ulna in flexion, while the posterior great one receives the olecranon in extension of the fore-arm.

## FŒTAL STATE.

The Epiphyses of this bone are cartilaginous in the fœtus.

## ARTICULATION.

The Os Humeri is connected superiorly to the Scapula, and inferiorly to the Radius and Ulna.



## USE.

The situation of this bone sufficiently explains its use. While it permits extensive motion to the arm by its articulation with the scapula, it serves as a fulcrum for the motions of the Bones of the fore-arm.

*BONES OF THE FORE-ARM.*

These consist of two, viz. the ULNA and RADIUS.

## ULNA.

This Bone is situated on the internal side of the fore-arm, and consists of two EPIPHYSES and a DIAPHYSIS.

## SUPERIOR EPIPHYSIS.

This portion is depressed anteriorly by a GREAT SIGMOID CAVITY, adapted to the Trochlea of the Humerus;—behind this Cavity the top of the bone is termed OLECRANON, and has inserted into it the Triceps Extensor Cubiti;—Before the cavity is the CORONOID PROCESS of the Bone, anterior to which is inserted the Brachialis internus.—On the back of this Epiphysis there is a long triangular surface upon which we occasionally rest;—the external edge of this surface gives attachment to the Anconeus which lies in the cavity on the outside of it;—external still to this, is a small ridge of the Epiphysis from which arises a part of the Supinator Radii Brevis;—at the top of this ridge the bone is formed into a LESSER SIGMOID CAVITY for the head of the Radius, and both this and the other cavity give origin by their edges to a capsular liga-



ment.—Exactly opposite the lesser sigmoid cavity on the other side of the bone, the Epiphysis is considerably depressed for the origin of the Flexor Digitorum Profundus.

### DIAPHYSIS.

This portion of the Bone is triangular ; its internal ridge is sharpest, and has the interosseous ligament fixed to it, while its anterior and posterior angles are rounded by muscles ;—its outer side is smooth ;—its anterior side is less so, and has, at about one-third from the top of the bone, a canal slanting upward for its medullary artery.—Its posterior side is extremely irregular from the origin of several muscles.—Toward the inferior part of the diaphysis, a ridge anteriorly gives origin to the Pronator Radii Quadratus.

### INFERIOR EPIPHYSIS.

This consists of two portions ; externally of a round head, which is laterally connected with the radius, and inferiorly with the carpus ; and internally of a styloid process, from which a ligament passes to the Os Pisiforme ;—between these two portions, posteriorly, a groove transmits the Tendon of the Extensor Carpi Ulnaris, and anteriorly another transmits the Ulnar Artery and Nerve.

### FÆTAL STATE.

The Epiphyses of this bone are cartilaginous in the fœtus.

### ARTICULATION.

Superiorly the Ulna is connected to the Humerus and to the Radius, and inferiorly it is connected to the Radius and the Carpus.

## USE.

This is explained by its situation.

## RADIUS.

This Bone is situated on the outside of the fore-arm, and consists of a Diaphysis with two Epiphyses.

## SUPERIOR EPIPHYSIS.

This consists of a round head, depressed superiorly for articulation with the Humerus, and having an articular surface on its outer side for connection with the sigmoid cavity of the ulna;—a ridge surrounding these surfaces gives attachment to its capsule.—Immediately below the head is situated the CERVIX or NECK of the Bone, into a small ridge on the inner side of which is partly inserted the supinator Radii Brevis;—Immediately beneath this is situated the Tubercle of the bone, to the outer edge of which a part of the same muscle is attached, and to its middle is fixed the Biceps Cubiti.

## DIAPHYSIS.

Anteriorly the upper part of the Diaphysis is marked by an oblique ridge which passes from the root of the tuberosity toward the outer edge of the middle of the bone, into this also the Supinator Radii Brevis is inserted.—Below this the Diaphysis becomes triangular, its outer angles being obtuse and its inner one acute for the attachment of the Interosseous ligament.—Its posterior surface is considerably flat, and its anterior one still more so; from it arises the Flexor Longus Pollicis, and the medullary artery slants upward in it about one-

third from the top of the bone.—The lower end of the Diaphysis becomes considerably flat, where the Pronator Radii Teres passes over it to be inserted at its outer edge. This flat surface is continued upon the

### INFERIOR EPIPHYSIS,

Over which anteriorly the same muscle also passes.—Posteriorly this Epiphysis has several grooves formed in it ;—those on its external side lodge the Tendons of the Extensors of the first and second joints of the thumb ;—the two broad impressions next to these contain the Tendons of the Extensor Carpi Radialis Longior and Extensor Carpi Radialis Brevior ;—the narrow groove internal to these, lodges the Tendons of the Extensor of the third joint of the thumb ; and the broad depression internal still to the last, transmits the tendons of the Indicator and Extensor Comminus.—The termination of this Epiphysis forms an oblong ARTICULAR CAVITY, which is connected with the bones of the Carpus ;—its edges give rise to the capsular ligament of the joint, and toward its outer end a STYLOID PROCESS is formed from which a ligament passes to the carpus.

### FŒTAL STATE.

The Epiphyses of this bone are cartilaginous in the fœtus.

### ARTICULATION.

The Radius is connected superiorly, to the Humerus and Ulna, and inferiorly to the Ulna and Carpus.

### USE.

This Bone at once serves the purposes of flexion and extension, in common with the Ulna, and is calculated to effect the pronation and supination of the hand.

## BONES OF THE HAND.

These include all the inferior portion of the upper extremity, and are divided into the CARPUS, METACARPUS, THUMB, and FINGERS.

### CARPUS.

This consists of eight distinct small bones, and forms the upper part of the hand.—The names of these bones are OS SCAPHOIDES, LUNARE, CUNEIFORME, and PIZIFORME, forming the *first row*—OS TRAPEZIUM, TRAPEZOIDES, MAGNUM, and UNCIFORME, forming the second.

The OS SCAPHOIDES being of a long form, somewhat convex above and concave below, is the most external of the first row. It is articulated with the Radius.

The OS LUNARE is also convex above and concave below, with a crescent-formed edge, and is the second of the first row, being also articulated with the Radius.

The OS CUNEIFORME has nothing of the wedge-like form, but its inferior surface has upon it a circular depressed plane. It forms the third of the first row, and is articulated with the Ulna, a triangular cartilage intervening between them.

The OS PIZIFORME is a small round bone placed on the circular plane of the cuneiforme, and projecting into the palm of the hand.—To its upper part the tendon of the Flexor Carpi Ulnaris and a ligament from the styloid process of the ulna, are fixed;—to its palmar side the annular ligament is fixed;—over its other side the ulnar nerve passes;—from its anterior part the Abductor Minimi Digiti arises,—and from its inferior part a ligament passes to the metacarpal bone of the little finger.

The *OS TRAPEZIUM* is the first bone of the second row. Its fore part projects into the palm; its inferior surface is concave for articulation with the first bone of the thumb; from the eminence on its fore-part the Abductor and Flexor Primi Internodii Pollicis arise; and in the groove internal to it the tendon of the Flexor Carpi Radialis and also that of the Flexor Tertii Internodii Pollicis passes.

The *OS TRAPEZOIDES* is of an irregular cubical figure, and sustains the metacarpal bone of the fore-finger; it is the second bone of the second row.

The *OS MAGNUM* is the largest bone of the wrist. Its round head is articulated above to the concavity of the *Os Scaphoides* and *Lunare*, and below to the metacarpal bone of the middle finger. This is the third bone of the second row.

The *OS UNCIFORME*, the fourth bone of the second row, has a remarkable process called *UNCIFORM* which projects into the palm; from the Palmar side of which the annular Ligament proceeds; and from its fore-part the Flexor and Abductor Minimi Digni; its lower end has articulated to it the metacarpal bones of the ring and little finger.

The whole of these Bones are convex posteriorly, by which means they are rendered stronger, and concave anteriorly to permit the passage of vessels, &c.

## METACARPUS.

This consists of four bones, the broad BASES of which are connected as we have already described;—they are somewhat rounded posteriorly and concave anteriorly—and terminate in oblong HEADS covered by cartilage for articulation with the first Phalanx of the fingers. From each side of the roots of

these heads, small TUBERCLES project, by means of which transverse ligaments connect the bones.

At Birth the ends of these bones are cartilaginous, and afterwards become Epiphyses.

## PHALANGES OF THE THUMB AND FINGERS.

These are connected as we have already described. The BASES of these Bones are broad; and each of them, except those of the last Phalanx, possesses an oblong smooth HEAD by which it is connected to the succeeding one, capsular ligaments arising around each.—All of them are convex posteriorly and concave anteriorly.

The USE of all the Bones of the Hand is sufficiently apparent without further description, and their articulation must already be sufficiently understood.

## OSTEOLOGY.

### OF THE BONES OF THE LOWER EXTREMITIES.

#### *BONE OF THE THIGH.*

#### OS FEMORIS.

This is a cylindrical bone, and the largest in the body. It consists of two Epiphyses and a middle Diaphysis.

#### SUPERIOR EPIPHYSIS.

From the upper internal part of this Epiphysis a great cylindrical Apophysis or process of the bone projects upward and inward. This is denominated the *CERVIX* of the bone;—it terminates in a large round *HEAD* covered by cartilage, in the recent subject, having a small depression towards its lower internal part; from which the round ligament goes out to the *Acetabulum*, the rest of it being enveloped by a capsular ligament which is implanted around the root of the neck, from the inner side of which transverse filaments pass also into numerous foramina of the *Cervix*.—Another great, though less elevated Apophysis, projects directly upward from this Epiphysis: it is termed the *TROCHANTER MAJOR*, and its outer side is marked by three great depressions; over the posterior, the *gluteus maximus* passes; into the middle one, the *gluteus medius* is inserted, and into the anterior one, the *gluteus minimus*



is fixed.—Its top is also marked by two depressions; the pyramiformis being attached to the anterior one, and the gemelli and obturator internus to the posterior one.—Internally and somewhat posteriorly to the great Trochanter, is a deep PIT in which the obturator Externus is inserted.—Upon the inner posterior part of this Epiphysis is situated another process denominated the TROCHANTER MINOR: into it are fixed the Psoas Magnus and Iliacus internus.—A rough ridge passes obliquely over the anterior part of this Epiphysis, from the Trochanter Major to the Trochanter Minor: into it is inserted the capsule of the joint.—Another ridge passes, between the same points, upon the posterior part of the bone, into which is fixed the Quadratus Femoris.

#### DIAPHYSIS.

This portion of the bone is somewhat convex anteriorly, and concave posteriorly, flattened slightly before by the erureus and rectus, and laterally by the Vasti.—The posterior side of the Diaphysis has a rough ridge passing down its middle, called LINEA ASPERA; this ridge divides superiorly, toward the Trochanters, and inferiorly, it bifurcates toward the Condyles of the bone;—from the whole external edge of it the Vastus externus arises;—into the upper part of the external ridge, a little below the great Trochanter, the Gluteus Maximus is inserted;—into the upper part of the internal edge, immediately below the less Trochanter, the Pectinalis is inserted.—Where the two upper portions of the ridge join, the medullary artery slants upward through the bone.—Immediately above its foramen, the short head of the Triceps is inserted; and immediately below it the long one.—Upon the same part of the ridge, but external to those two insertions, the fleshy part of the great head of the same muscle is fixed;—its aponeurosis is continued

down the ridge which leads to the internal Condyle, into a tuberosity above the posterior part of which, its strong tendon is implanted. This internal portion of the ridge is defective about its middle where the femoral artery perforates the aponeurosis of the Triceps. From the whole extent of the internal ridge, the Vastus internus arises. From about the middle of the Linea Aspera, the short head of the Biceps Cruris arises.—The space between the ridges where they bifurcate, is termed the Ham, and contains the Popliteal nerves and vessels bedded in fat.

#### INFERIOR DIAPHYSIS.

The bone here considerably enlarges, and is divided into two great protuberances, which are termed **CONDYLES**;—these are divided posteriorly by a great **NOTCH**, through which pass the nerves and vessels to the leg.—The sides of this notch give rise to the external and internal Crucial Ligaments.—On each side of it the posterior and inferior surfaces of the Condyles, as well as that portion of the Epiphysis which is anterior to the notch is articular.—The internal Condyle is longer than the external, which makes amends for the oblique position of the femur, by giving a perpendicular direction to the leg.—Anteriorly, however, the internal side of the articular surface is more depressed than the external.—All around this articular surface a rough edge gives origin to the Capsular Ligament.—The external sides of both Condyles have, toward the posterior upper part of each, a depression for the origins of the Gastrocnemii, and, more laterally, one for each lateral ligament.—The external one has also, toward its lower edge, a deep impression where the popliteus arises.

## FÆTAL STATE.

All the great processes of this bone are cartilaginous in the fœtus.

## ARTICULATION.

The Os Femoris is connected above to the Acetabulum of the Os Innominatum, and below to the top of the Tibia.

Its situation sufficiently explains its use.

*BONES OF THE LEG.*

These are three in number, viz. the ROTULA superiorly, which properly belongs to the Knee; and below it, the two long bones called TIBIA and FIBULA.

## ROTULA OR PATELLA.

This is the small round and flat bone, placed before the joint of the Knee;—into its upper edge the Rectus Cruris and Vasti are inserted;—and from its inferior point, a strong ligament proceeds to the fore part of the TIBIA. The external surface of the bone is slightly rough, and perforated by numerous foramina; its internal surface is smooth; formed by cartilage into an articular surface, and divided, by a middle ridge, into two lateral cavities, the external of which is largest to correspond with the greater projection of the external Condyle, over which it is situated.

## FÆTAL STATE.

This bone is cartilaginous at birth.

## TIBIA.

This is a strong triangular bone, composed of a Diaphysis and two Epiphyses.

## SUPERIOR EPIPHYSIS.

It is flatted superiorly, and divided into two slight CAVITIES, the internal of which is largest, to suit the internal Condyle of the femur.—The ROUGH RIDGE which divides them has the anterior crucial ligament inserted into its middle, and the posterior crucial ligament into its back part.—The edges of the cavities which it divides are elevated by a semilunar cartilage placed in each.—From the back of each cavity there is a ROUGH PROTUBERANCE, called POSTERIOR; into the middle of the INTERNAL one the Semi-membranosus is fixed, and into its outside the internal lateral ligament is inserted.—The back of the EXTERNAL one is depressed by the passage of the Popliteus superiorly, and inferiorly by an articular surface for the top of the fibula.—The external side of this tuberosity has the external lateral ligament of the joint fixed into it—A RIDGE running downward from the internal tuberosity gives attachment to the Popliteus, and a SPINE passing obliquely downward and outward from the back of the external tuberosity gives origin to a part of the Soleus, to the Tibialis Posticus, and to the Flexor Longus Digitorum, and also insertion to the Aponeurosis of the Popliteus.—Upon the anterior part of this Epiphysis is another considerable PROTUBERANCE called ANTERIOR, into which the ligament of the Patella is fixed.—The internal side of this protuberance has the Sartorius, Gracilis, and Semitendinosus, inserted into it, and its external side gives origin to the Tibialis Anticus, and to the Extensor Longus Digitorum.

## DIAPHYSIS.

This portion of the bone is very nearly triangular; its anterior triangle, which is sharpest, is called its *SPINE*. Internal to this, the surface of the bone is covered only by Periosteum and integuments.—Externally to it, the bone is depressed, above by the *Tibialis Anticus*, and below by the same muscle, the *Extensor Longus Digitorum*, and the *Extensor Longus Pollicis*.—The other angles are somewhat rounded, and its posterior surface is depressed by the *Tibialis Posticus* and the *Flexor Longus Digitorum*; upon this side of the Diaphysis, the Medullary artery slants downward, about one-third from the top of the bone, near which its internal angle is imperfect by the passage of the *Tibialis Posticus* from its anterior part.

## INFERIOR EPIPHYSIS.

This portion of the bone is much smaller than the superior one; and is anteriorly and posteriorly depressed by the flexors and extensors of the foot.—Externally it is hollowed for the reception of the fibula;—internally it is produced into a considerable process called *MALLEOLUS INTERNUS*, from the tip of which ligaments are sent to the foot; and—inferiorly it forms a *TROCHLEA* for the *Astragalus*.

## FŒTAL STATE.

Both Epiphyses of this bone are cartilaginous at birth.

## ARTICULATION.

The Tibia is connected above to the Femur, below to the *Astragalus*. and, at the upper and lower parts of its external side, to the Fibula.

Its situation explains its use.

## FIBULA.

This is a long, small and irregularly triangular bone, situated on the outside of the leg. It consists of a Diaphysis and two Epiphyses.

## SUPERIOR EPIPHYSIS.

The upper part of this portion of the bone has upon it an oblong articular depression for connection with the head of the Tibia.—On its external part there is a considerable elevation, into which the tendon of the biceps and the lateral ligament of the joint are fixed.—On its posterior part there is a roughness, from which the Soleus arises.

## DIAPHYSIS.

The anterior angle of this portion is sharpest ; it is not however into it that the Interosseous ligament is fixed, but into an OBLIQUE RIDGE which extends across its inner side, from the upper part of its anterior to the lower part of its inferior angle.—The PLANE ANTERIOR to this ridge gives origin to the Extensor Longus Digitorum, and the Extensor Longus Pollicis at its narrow upper part, and to the Nonus Vesalii at its broad inferior part.—The POSTERIOR PLANE of this internal side gives rise to the Tibialis Posticus and to the Flexor Longus Digitorum.—From the back of the Fibula the Soleus arises above and the Flexor Longus Pollicis below.—About the middle of this side of its Diaphysis, the canal of the medullary artery slants downward.—The external side of the bone is flattened by the origiu and passage of the two Peronei.

## INFERIOR EPIPHYSIS.

This is produced into a long process termed Malleolus Ex-



ternus—The upper part of its internal side is rough where it is connected with the Tibia—Its middle part has a smooth articular surface for the Astragalus, and—its lower part has a cavity for mucous glands.—The tip of this Epiphysis is depressed where it sends out ligaments to the foot, and—its posterior part is somewhat furrowed by the tendons of the Peronei.

#### FOETAL STATE.

Both Epiphyses of this bone are cartilaginous in the foetus.

#### ARTICULATION.

The Fibula is connected above to the Tibia, and below to the same bone and to the Astragalus.

Its situation explains its use.

### *BONES OF THE FOOT.*

These are divided into three classes, viz. the TARSUS, the METATARSUS and the PHALANGES of the toes.

#### TARSUS.

This consists of seven bones, viz. the ASTRAGALUS, OS CALCIS, NAVICULARE, CUBOIDES, CUNEIFORME EXTERNUM, MEDIUM, and INTERNUM.

ASTRAGALUS. This is the uppermost of the Tarsal bones—The smooth PULLEY at its upper part is articulated to the Trochlea of the Tibia and Fibula. Its lower surface is divided by a deep FOSSA which passes from its inner side obliquely forward and outward—The SURFACE POSTERIOR to this is articulated to the Os Calcis—The one ANTERIOR to it is also articulated with the same bone, except its internal part, which rests upon a ligament extended from the Os Calcis to the Os



**Naviculare**—The posterior edge of the surface behind the fossa forms a process which is depressed by the Tendon of the Flexor Longus Pollicis—The anterior part of the bone forms a smooth oblong HEAD, and is connected with the Os Naviculare.

**Os CALCIS.** This bone is situated below the former.—Its great projection backward forms the HEEL, the posterior part of which is rough for the insertion of the Tendo Achillis.—The fore-part of its upper surface exactly corresponds to the lower surface of the Astragalus, and—behind the posterior surface of this upper portion, a furrow is made by the Flexor Longus Digitorum, and another by the Flexor Longus Pollicis—Before this furrow a protuberance gives rise to the ligament passing to the Naviculare and to the Flexor Digitorum Brevis—The lower side of the Bone forms posteriorly two TUBEROSITIES, the INTERNAL of which gives rise to the Adductor Pollicis, the Flexor Digitorum Brevis, some of the Plantar Aponeurosis, and some of the Abductor Minimi Digiti—The EXTERNAL gives rise to the other part of the same muscle and of the aponeurosis—The great CONCAVITY before these protuberances lodges the tendons of the muscles, the nerves, and vessels passing to the toes—The oblong articular surface upon the forepart of the Os Calcis is connected to the Os Naviculare.

**Os NAVICULARE.** This Bone is concave posteriorly, and somewhat convex anteriorly—Into a rough protuberance on its inside the Tibialis Posticus, the ligament from the Os Calcis, and another ligament from the metatarsal bones of the third and fourth toes, are inserted; the adductor Pollicis also arises from it—The three cuneiform bones are connected to its anterior surface.

**Os CUBOIDES.** This is the most external of the second row of

Bones. Behind, it is connected to the *Os Calcis*; internally, to the *Os Naviculare* and *Cuneiforme externum*; and anteriorly, it supports the metatarsal bones of the fourth and fifth toes.—On the inner side of its inferior surface a rough protuberance gives rise to the *abductor Pollicis*, and—a fossa before it transmits the Tendon of the *Peroneus Longus*.

*OS CUNEIFORME EXTERNUM.* This bone is placed internally to the *Cuboides*; it is somewhat of a wedgelike form; externally connected to the *Cuboides*; internally, to the *Cuneiforme Medium*; posteriorly, to the *Naviculare*; and anteriorly to the metatarsal bone of the third toe.

*OS CUNEIFORME MEDIUM*, placed internally to the former, is connected behind, to the *naviculare*; before, to the metatarsal bone of the second toe; and, on each side, to the other *cuneiforme* bones.

*OS CUNEIFORME INTERNUM.* This bone is connected posteriorly, to the *naviculare*; anteriorly, to the metatarsal bone of the great toe; and externally to the middle *cuneiforme* bone—The internal side of its lower surface has a rough protuberance which gives origin to the *adductor Pollicis*; and—a tuberosity on its upper part has the *Tibialis Anticus* inserted into it.

#### FŒTAL STATE.

Almost all these Bones, except the *Astragalus* and *Os Calcis*, are cartilaginous at birth.

Their Articulation has been explained in the description of each.

By forming a great convexity above, and a concavity below, they at once give strength to the foot and transmit its vessels, &c.

## METATARSUS.

This is composed of five Bones, somewhat stronger than those of the Metacarpus, with broader bases, and heads proportionally smaller. The sides of their bodies are flatter, and the tubercles on each side their heads are larger.

## PHALANGES OF THE TOES.

These are three in number, four Bones composing each Phalanx. But the great Toe has only two Bones. They are all shorter and less flat than those of the fingers.

## OSSA SESSAMOIDEA.

These are small round bones, flattened at their upper part, and placed below several of the joints.

## MARKS OF THE FEMALE SKELETON.

In the Female Skeleton the SKULL is proportionally larger than that of the Male; the other BONES are smaller in proportion to their length; their DEPRESSIONS and PROTUBERANCES are less remarkable; the OS FRONTIS has frequently a suture down the middle; the CLAVICLES are straighter; the STERNUM is more elevated below; the XIPHOID CARTILAGE is more frequently bifurcated; the CARTILAGES of the inferior ribs are longer, to enlarge the chest; the CARTILAGES of the middle ones are flattened by the Mammæ; the CARTILAGES of the upper ones sooner ossify to support the weight of these bodies; the VERTEBRAL CANAL is larger; the OS SACRUM is wider and more concave; the OS COCCYGIS is more moveable; the OSSA ILII are more concave and more turned outward; the CARTILAGE of the PUBIS is thicker; the ARCHES of the PUBIS and of the ILIUM with the ISCHIUM are larger; the TUBEROSITIES are more distant and flat, and the BONES of the THIGHS are more removed from each other.

## CHONDROLOGY.

All the articular surfaces of the Bones which we have described are covered by cartilages. It is therefore unnecessary to detail this in the description of each joint. Where, however, Interarticular cartilages exist, they shall always be mentioned.

## SYNDESMOLOGY.

### OF THE LIGAMENTS OF THE HEAD AND TRUNK.

#### *LIGAMENTS OF THE LOWER JAW.*

These are two on each side, viz. a *capsular* and a *lateral*.

#### CAPSULAR LIGAMENT.

This arises round the Articular Surface of the Squamous portion of the temporal Bone, and, enclosing in its passage downward an Interarticular Cartilage, is fixed round the condyloid process of the lower Jaw.

#### LATERAL LIGAMENT.

This arises from the root of the Styloid process of the temporal bone, and is inserted into the inside of the angle of the Lower Jaw.



#### *LIGAMENTS OF THE VERTEBRÆ IN GENERAL.*

Of these there are seven kinds: viz. the *Common Anterior Ligament*, the *Common Posterior*, and the *Crucial* or *Intervertebral*, the *Capsules* of the oblique processes, the *Intertransverse*, the *Subflava*, and the *Interspinous*.

### COMMON ANTERIOR LIGAMENT.

This arises from the fore-part of the first Vertebra, and covers the anterior part of the whole Spinal Column as far down as the Os Sacrum.

### COMMON POSTERIOR LIGAMENT.

This arises from the anterior part of the Foramen Magnum, and covers the posterior part of the bodies of the Vertebrae to the termination of the Os Sacrum.

### CRUCIAL OR INTERVERTEBRAL LIGAMENTS.

These ligaments cross each other obliquely from the edge of one Vertebra to that of another.

### CAPSULES OF THE OBLIQUE PROCESSES.

These arise from the edge of one oblique process, and surround that of another.

### INTERTRANSVERSE LIGAMENTS.

These pass between the Transverse processes of the Vertebrae.

### LIGAMENTA SUBFLAVA.

These connect the posterior bony arches of the Vertebrae.

### INTERSPINOUS LIGAMENTS.

These connect the spinous processes of the Vertebrae.



*LIGAMENTS PECULIAR TO THE CERVICAL  
VERTEBRÆ.*

These are two: viz. the *Ligamentum Nuchæ* common to the whole, and the *Transverse Ligament* belonging to the two first.

LIGAMENTUM NUCHÆ.

This arises from the Spine of the Occiput, and is attached to the spinous processes of all the cervical Vertebrae.

TRANSVERSE LIGAMENT OF THE ATLAS.

This is attached to a small tuberosity, on each side of the articular depression behind the anterior arch of the Atlas, and encloses the tooth-like process of the Dentatus—It sends one process up to the Occiput, and another down to the inferior Vertebrae.

*LIGAMENTS FROM THE FIRST VERTEBRÆ TO  
THE OCCIPUT.*

These are two in number, being *those* of the *Anterior* and *Posterior Arches* of the *Atlas*.

LIGAMENT OF THE ANTERIOR ARCH OF THE  
ATLAS.

This Ligament arises from the above mentioned portion of the Atlas, and is inserted into the anterior edge of the Foramen Magnum.

### LIGAMENT OF THE POSTERIOR ARCH OF THE ATLAS.

It arises from the posterior arch of the Atlas, and is inserted into the posterior edge of the Foramen Magnum.

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### LIGAMENTS FROM THE SECOND VERTEBRÆ TO THE OCCIPUT.

These are two in number, the *Perpendicular* and the *Trans-*  
*verse*.

#### PERPENDICULAR LIGAMENT.

This arises from the tip of the tooth-like process of the second Vertebra, and is inserted into the edge of the Foramen Magnum between the Condyles.

#### LATERAL LIGAMENTS.

These arise from each side of the Processus Dentatus, and are inserted into the occiput before the condyles, and also into the inside of the atlas.

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### LIGAMENTS CONNECTING THE RIBS AND VER- TEBRÆ.

Of these there are six kinds, viz. the *Capsules* of the *Heads* of the *Ribs*, the *Capsules* of the *Tubercles* of the *Ribs*, the *Externæ*

*Ligaments of the Necks of the Ribs, the Internal Ligaments of the Necks of the Ribs, the External Transverse Ligaments, and the Internal Transverse Ligaments.*

#### CAPSULES OF THE HEADS OF THE RIBS.

These surround their junction with the bodies of the Vertebrae.

#### CAPSULES OF THE TUBERCLES OF THE RIBS.

These surround their junction with the transverse processes of the Vertebrae.

#### EXTERNAL LIGAMENTS OF THE NECKS OF THE RIBS.

These arise from the roots of the oblique processes, and are inserted into the necks of the Ribs.

#### INTERNAL LIGAMENTS OF THE NECKS OF THE RIBS.

These arise from the lower edges of the transverse processes, and are inserted into the internal part of the necks of the Ribs.

#### EXTERNAL TRANSVERSE LIGAMENT.

This arises from the transverse process, and is inserted into the angle of each Rib.

#### INTERNAL TRANSVERSE LIGAMENT

Arises from the body of each Vertebra, and is inserted anteriorly a little beyond the head of each Rib.

LIGAMENTS CONNECTING THE RIBS TO EACH OTHER.

These are called CORUSCATING LIGAMENTS, and pass between their Cartilages.

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LIGAMENTS CONNECTING THE RIBS AND STERNUM.

These are of two kinds, viz. *Capsular Ligaments* and *Transverse* ones.

CAPSULES OF THE ANTERIOR ENDS OF THE RIBS.

These connect them to the depressions of the Sternum.

EXTERNAL AND INTERNAL TRANSVERSE LIGAMENTS.

These externally and internally connect the cartilages of the Ribs to the Sternum.

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PROPER LIGAMENTS OF THE STERNUM.

These are two, viz. the *common Membrane* of the *Sternum*, and the *Ligaments* of the *Xiphoid Cartilage*.

MEMBRANE OF THE STERNUM.

This as a sheath completely invests the Sternum, and connects the bones of which it consists.

LIGAMENTS OF THE XIPHOID CARTILAGE.

These arise from the seventh rib and second bone of the Sternum, and are inserted into the third.

### LIGAMENTS OF THE PELVIS.

These are anteriorly of three kinds, viz. *Poupart's Ligament*, the *Annular Ligament*, and the *Obturator Ligament*; posteriorly they are of six kinds, viz. the *Transverse*, the *Ileo-Sacral*, the *Ligamenta Vaga*, the *short Ischiatic*, the *long Ischiatic*, and the *Lacertus Ligamentosus*.

#### POUPART'S LIGAMENT.

This Ligament arises from the anterior superior spinous process of the Ilium, and is inserted into the angle of the Pubis. Some of its fibres are inserted into the Pubis before it reaches the angle, and it is these which are to be divided in Gimbernat's operation.

#### ANNULAR LIGAMENT.

This surrounds the articulation of the Ossa Pubis.

#### OBTURATOR LIGAMENT.

This closes up the foramen Thyroideum, leaving only a small notch at its superior part.

#### TRANSVERSE LIGAMENTS.

These arise from the transverse processes of the fourth and fifth Lumbar Vertebrae, and are inserted into posterior superior spinous process of the Ilium.

#### ILEO-SACRAL LIGAMENT.

This arises from the superior posterior spine of the Ilium, and is inserted into the back of the Sacrum.

### LIGAMENTA VAGA.

These are numerous small ligaments which pass from the Ilium to the Sacrum anteriorly and posteriorly.

### SHORT SACRO-ISCHIATIC LIGAMENT.

This arises from the spine of the Ischium, and is inserted into the posterior part of the transverse process of the Sacrum.

### LONG SACRO-ISCHIATIC LIGAMENT.

This arises from the internal edge of the Tuberosity of the Ischium, and is inserted along with the last.

### LACERTUS LIGAMENTOSUS.

This passes anteriorly from the body of the fourth Lumbar Vertebra, along the ridge of the Os Innominatum, to the symphysis of the Pubis.

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### LIGAMENTS OF THE OS COCCYGIS.

These are of four kinds, viz. CAPSULAR, ANTERIOR, POSTERIOR and LATERAL.

## SYNDESMOLOGY.

OF THE LIGAMENTS OF THE UPPER  
EXTREMITY.*LIGAMENTS OF THE STERNAL END OF THE  
CLAVICLE.*

These are three in number, viz. the *Capsular* Ligament of the sternal end of the Clavicle, the *Interclavicular* Ligament, and the *Rhomboid* Ligament.

## CAPSULAR LIGAMENT.

This arises around the depression of the Sternum, and, involving an interarticular cartilage, is inserted around the end of the Clavicle.

## INTERCLAVICULAR LIGAMENT.

This passes behind the Sternum from the end of one Clavicle to that of the other.

## RHOMBOID LIGAMENT.

This connects the first Rib and Clavicle near the Sternum.



## LIGAMENTS CONNECTING THE CLAVICLE AND SCAPULA.

These are three in number, viz. the *Capsular*, the *Conoid*, and the *Trapezoid*.

### CAPSULAR LIGAMENT.

This arises around the sternal end of the Clavicle, and is fixed round the articular surface of the Acromion.

### CONOID LIGAMENT.

This arises pointed from the root of the coracoid process, and is inserted into the inferior side of this end of the Clavicle.

### TRAPEZOID LIGAMENT.

This ligament differs in form from the last, but has nearly the same origin and insertion.

## LIGAMENTS PROPER TO THE SCAPULA.

These are two in number, viz. an *Anterior* and a *Posterior*.

### PROPER ANTERIOR LIGAMENT.

This arises from the upper edge of the Acromion, and is inserted into that of the coracoid process.

### PROPER POSTERIOR LIGAMENT.

This arises from the root of the coracoid process, and passes over the notch to the superior costa of the bone.

### LIGAMENTS CONNECTING THE SCAPULA AND HUMERUS.

These are two in number, viz. the *Capsular* and the upper part of the Tendon of the Biceps.

#### CAPSULAR LIGAMENT.

This arises from the margin of the Glenoid Cavity, and is inserted round the neck of the Humerus.

#### TENDON OF THE BICEPS.

This arises from the upper edge of the Glenoid Cavity, and, being fixed to the top of the Humerus, forms a ligament of the shoulder joint.

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### LIGAMENTS PROPER TO THE HUMERUS.

These are two in number, viz. the *External* and the *Internal Intermuscular*.

#### EXTERNAL INTERMUSCULAR.

This arises from the external Condyle, and is inserted into the middle of the outside of the bone.

#### INTERNAL INTERMUSCULAR.

This arises from the internal Condyle, and is inserted into the middle of the inside of the bone.

# LIGAMENTS CONNECTING THE HUMERUS TO THE RADIUS AND ULNA.

These are three in number, viz. the *Capsular* and the *External* and *Internal Lateral*.

## CAPSULAR LIGAMENT.

This arises round the Trochlea of the Humerus, and is inserted around the heads of the Radius and Ulna.

## EXTERNAL LATERAL LIGAMENT.

This arises from the external Condyle of the Humerus, and is inserted into the outside of the neck of the Radius.

## INTERNAL LATERAL LIGAMENT.

This arises from the internal Condyle, and is inserted into the inner side of the coronoid process of the Ulna.

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# LIGAMENTS CONNECTING THE RADIUS AND ULNA.

These are four in number, viz. the *Coronary*, the *Oblique*, the *Interosseous*, and the *Sacciform*.

## CORONARY LIGAMENT.

Arising from the Ulna, this surrounds the head of the Radius.

## OBLIQUE LIGAMENT.

This arises from the base of the coronoid process of the Ulna, and is inserted into the tubercle of the Radius.

## INTEROSSEOUS LIGAMENT.

This arises from the internal acute angle of one Bone, and is inserted into that of the other.

## SACCIFORM LIGAMENT.

This unites in a distinct articulation the lower ends of the Radius and Ulna.

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*LIGAMENTS FROM THE RADIUS AND ULNA TO THE CARPUS.*

These are three in number, viz. the *Capsular*, the *External* and the *Internal Lateral*. Between the end of the Ulna and the Os Naviculare, a triangular interarticular cartilage is placed.

## CAPSULAR LIGAMENT.

This arises around the lower articular surfaces of the Radius and Ulna, and is inserted round the three first bones of the Carpus.

## EXTERNAL LATERAL LIGAMENT.

This arises from the styloid process of the Radius, and is inserted into the outside of the Os Scaphoides.

## INTERNAL LATERAL LIGAMENT.

This arises from the styloid process of the Ulna, and is inserted into the outside of the Os Cuneiforme and Unciforme.

*LIGAMENTS OF THE CARPUS.*

These are of five kinds, viz. the *Capsular*, the *Transverse*, the *Posterior Annular*, the *Anterior Annular*, and the *Vaginal*.

CAPSULAR LIGAMENT.

This surrounds and connects all the carpal Bones.

TRANSVERSE LIGAMENTS.

These, passing from one to another, tie the individual bones together.

POSTERIOR ANNULAR LIGAMENT.

This binds down the tendons of the Extensor Muscles to the back of the Carpus.

ANTERIOR ANNULAR LIGAMENT.

This arises from the Os Pisiforme and Unciforme, and is inserted into the Trapezium, tying down the Flexor Tendons.

VAGINAL LIGAMENTS.

These proceed from within the anterior annular, and sheath the flexor tendons.

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*LIGAMENTS OF THE BASES OF THE METACARPAL BONES.*

These are of four kinds, viz. the *Capsular*, the *Lateral*, the *Dorsal*, and the *Palmar*.

## CAPSULAR LIGAMENTS.

These are derived from that of the Carpus, which includes the bases of these bones.

## LATERAL LIGAMENTS.

These are situated on each side the articulations.

## DORSAL LIGAMENTS.

These are transverse ligaments connecting the bases of these Bones, on the back of the Hand.

## PALMAR LIGAMENTS.

These connect them similarly in the Palm.

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*LIGAMENTS OF THE HEADS OF THE METACARPAL BONES.*

These are of three kinds: viz. CAPSULAR, LATERAL, and TRANSVERSE.

*LIGAMENTS OF THE JOINTS OF THE FINGERS.*

These are at both joints CAPSULAR and LATERAL.

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*LIGAMENTS CONFINING THE TENDONS OF THE HAND AND FINGERS.*

These are the following:

## VAGINAL LIGAMENTS;

Which proceed from the anterior and posterior Annular Ligaments, and sheath both the Flexor and Extensor Tendons.

TRANSVERSE LIGAMENTS OF THE EXTENSOR  
TENDONS.

These are small Ligaments connecting the Extensor Tendons.

TRANSVERSE PALMAR LIGAMENTS.

These join the Anterior Extremities of the Metacarpal  
Bones.

VAGINAL LIGAMENTS OF THE PHALANGES.

These run in a Transverse, Oblique, or Crucial direction  
over the Flexor Tendons, binding them to the Phalanges.

ACCESSORY LIGAMENTS OF THE FLEXOR  
TENDONS.

These are short Ligaments arising within the Vaginal from  
the Bones of the fingers, and inserted into these Tendons.



## SYNDESMOLOGY.

OF THE LIGAMENTS OF THE LOWER  
EXTREMITY.LIGAMENTS CONNECTING THE OS INNOMINA-  
TUM AND FEMUR.

These are of two kinds, a *Capsular* and a *Round* Ligament.

## CAPSULAR LIGAMENT.

This arises from the Margins of the Acetabulum, and is inserted around the root of the neck of the Femoral Bone; a reflected layer of this ligament passes up the neck to the edges of the head of the bone; and Transverse ligaments connect the one layer with the other.

## LIGAMENTUM TERES:

This arises from the small depression of the head of the Femur, and is inserted into the middle of the Acetabulum.

LIGAMENTS CONNECTING THE FEMUR WITH  
THE TIBIA AND FIBULA.

These are six in number; namely, the *Capsular*, *Popliteal*, *Internal Lateral*, *External Lateral*, *Anterior Crucial*, and *Posterior Crucial*.

## CAPSULAR LIGAMENT.

This passes from the edges of the articular surface of the Femur to those of the Tibia, being attached to the Rotula.

## POPLITEAL LIGAMENT.

This Ligament arises from the external Condyle of the Femur, and passing on the posterior part of the Capsular, is expanded upon the internal side of the joint.

## EXTERNAL LATERAL LIGAMENT.

This arises from the External Condyle, and is inserted into the head of the Fibula. It generally divides itself into two portions.

## INTERNAL LATERAL LIGAMENT.

This arises from the Internal Condyle, and is inserted into the inside of the head of the Tibia.

## POSTERIOR CRUCIAL LIGAMENT.

This arises from the inside of the notch between the Condyles of the Femur, and is inserted into the posterior part of the rough ridge on the top of the Tibia.

## ANTERIOR CRUCIAL LIGAMENT.

This arises from the outer side of the same notch, and is inserted into the middle of the same ridge.

*LIGAMENTS OF THE PATELLA.*

These are of two kinds: the *Anterior* Ligament and the *Alar* Ligaments.

## ANTERIOR LIGAMENT.

This arises from the inferior point of the Patella, and is inserted into the Anterior Tuberosity of the Tibia.

## ALAR LIGAMENTS.

These proceed, on each side, from the inner side of the Capsular, and are inserted into the sides of the Patella.

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*LIGAMENTS CONNECTING THE TIBIA AND FIBULA.*

These are of three kinds: viz. the *Capsular*, the *Interosseous*, and the *Transverse*.

## CAPSULAR LIGAMENT.

This connects the Upper Extremities of the Tibia and Fibula.

## INTEROSSEOUS LIGAMENT.

This connects the outer angle of the Tibia to a ridge on the inner side of the Fibula.

## TRANSVERSE LIGAMENTS.

These, anteriorly and posteriorly, connect the lower end of the Fibula to that of the Tibia.

*LIGAMENTS CONNECTING THE TIBIA AND FIBULA TO THE TARSUS.*

These are five in number, viz. the *Capsular*, the *Deltoid* and the *Anterior*, *Middle* and *Posterior* Ligaments of the Fibula.

CAPSULAR LIGAMENT.

This surrounds the junction of these Bones with the Astragalus.

DELTOID LIGAMENT.

This arises from the internal Malleolus, and is inserted into the Astragalus and Naviculare.

ANTERIOR LIGAMENT.

This arises from the External Malleolus, and is inserted into the outside of the Astragalus.

MIDDLE LIGAMENT.

This arises from the tip of the External Malleolus, and is inserted into the outside of the Os Calcis.

POSTERIOR LIGAMENT.

This arises from the back part of the external Malleolus, and is inserted into the back part of the Astragalus.

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*LIGAMENTS OF THE TARSUS.*

These are of three kinds, namely, the *Capsular*, the *Transverse*, the *Plantar*, and a ligament at the internal side of the Foot.

## CAPSULAR LIGAMENT.

This includes all the Tarsal and the heads of the Metatarsal bones.

## TRANSVERSE LIGAMENTS.

These, passing from one to another, tie the individual Bones together.

## PLANTAR LIGAMENT.

This is situated on the outside of the sole of the foot.

## INTERNAL LIGAMENT.

This passes from the lower part of the Os Calcis to the lower part of the Os Naviculare supporting the Astragalus.

*LIGAMENTS OF THE BASES OF THE METATARSAL BONES.*

These are of four kinds: viz. the *Capsular*, the *Lateral*, the *Dorsal*, and the *Plantar*.

## CAPSULAR LIGAMENTS.

These are derived from that of the Tarsus which includes the bases of these Bones.

## LATERAL LIGAMENTS.

These are situated on each side the Articulations.

## DORSAL LIGAMENTS.

These are Transverse Ligaments connecting these Bones on the back of the foot.

PLANTAR LIGAMENTS.

These connect them similarly in the sole of the foot.

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*LIGAMENTS OF THE HEADS OF THE METATARSAL BONES.*

These are of three kinds, viz. the CAPSULAR, the LATERAL, and the TRANSVERSE.

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*LIGAMENTS OF THE JOINTS OF THE TOES.*

These are at both joints CAPSULAR and LATERAL.

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*LIGAMENTS CONFINING THE TENDONS OF THE FOOT AND TOES.*

These are the following :

VAGINAL LIGAMENT OF THE TIBIA,

Which arises from the lower part of the Spine of the Tibia, and is fixed to the outer part of the Fibula.

CRUCIAL LIGAMENTS OF THE TARSUS.

These are double, one part of them arising above the external Malleolus, the other from a process of the Os Calcis ; passing over anteriorly ; one is fixed to the Malleolus Internus, the other to the inside of the Os Naviculare.

**LIGAMENT OF THE TENDONS OF THE PERONEI.**

This arises from the Os Calcis anteriorly, and is fixed into its outer side.

**LANCINATED LIGAMENT.**

This arises from the malleolus internus, and is inserted into the inner side of the Os Calcis, and the fat surrounding it.

**TRANSVERSE LIGAMENTS OF THE EXTENSOR TENDONS.**

These are small ligaments, connecting these Tendons to each other.

**VAGINAL LIGAMENTS OF THE FLEXOR TENDONS.**

These are Sheaths surrounding the tendons of the Flexor Muscles.

**ACCESSORY LIGAMENTS OF THE FLEXOR TENDONS.**

These are short ligaments arising, within the Vaginal, from the Bones of the Toes, and inserted into these Tendons.



## OF THE MUSCLES IN GENERAL.

### MUSCLES.

Muscles are bundles of contractile fibres. The middle portion of them is, generally speaking, their principal part. It is of a red colour from the blood which it contains, is comparatively softer and thicker than their other parts, and is alone capable of contraction.

### GENERAL NAMES OF MUSCLES DERIVED FROM STRUCTURE.

From the arrangement of the fibres which compose them, muscles derive various general names. If the fibres run longitudinally, the muscle is denominated SIMPLE; if they diverge toward its margins, it is named RADIATED; and, when they adopt a feathery arrangement, it is called Penniform.

### PARTICULAR NAMES OF MUSCLES.

Muscles derive their individual names from their *use*, their *form*, their *situation*, or their points of *attachment*. Those derived from the last source are the most valuable, as Sterno-Costalis, Sterno-Cleido Mastoideus, &c. Derived from situation, are the Occipito-Frontalis, Pectoralis, &c.; from form, the Trapezius, Rhomboideus, &c.; and from use, the Levators, Depressors, &c.

## TENDONS.

The extremities of Muscles, generally speaking, are denominated their Tendons. These are of a silvery hue, firm, compact, and incapable of contraction. That Extremity or Tendon of a Muscle which is fixed to the least movable point, is named the ORIGIN of the Muscle, while that which is fixed to the most moveable is called its INSERTION.

## MUSCLES OF THE TRUNK.

MUSCLES ARISING FROM THE TRUNK AND INSERTED INTO IT AND THE LINEA ALBA ARE FIVE IN NUMBER.

| SITUATION. | NAME.      | ORIGIN.                                                                                                                                                                                                                                                                                                                                                                                                                                  | INSERTION.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | USE.                                                                                                                                             |
|------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Laterally. | Obliquus   | From the inferior edges of the eight lower ribs, near their sternal ends, by an equal number of serrated digitations which intermix with the digitations of the serratus anticus. Posteriorly, it is covered where it passes from the last rib to the crista illi, by the latissimus dorsi, to which it adheres, and superiorly it is connected to the pectoralis major and intercostales: running downward and forward, it is inserted. | By a thin and broad tendon into a white line composed of the tendons of the abdominal muscles, called <i>linea alba</i> , extending from the last bone of the sternum to the Pubis. But before this tendon reaches the rectus abdominis, it unites with the tendons of the obliquus internus, and transversalis, and forms another white line called <i>linea semilunaris</i> . This muscle is also inserted into the middle of the crista illi, and into Poupart's ligament, extending from its anterior spine to the angle of the pubis, and transmits over this ligament a fascia to the thigh. The lower part of its tendon divides to form the abdominal ring for the spermatic cord in males. | To bend the body or to raise the pelvis, and, by compressing the abdomen, to assist in respiration, in evacuating the faeces, urine, foetus, &c. |
|            | Externus   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                  |
|            | Abdominis, |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                  |
|            | Descendens |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                  |

## THE SAME CLASS CONTINUED.

| SITUATION. | NAME.                                   | ORIGIN.                                                                                                                                                                                                                                                                                                                               | INSERTION.                                                                                                                                                                                                                                                                                                             | USE.                                                                 |
|------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Laterally  | Obliquus Internus Abdominis, Ascendens. | From Poupart's ligament, about the middle of which it sends off the cremaster, from all the crista ilii, and by a common tendon with the serratus posterior inferior, from the spines of the three lower lumbar vertebrae, and from the os sacrum.                                                                                    | Into the last bone of the sternum, into the cartilage of the last true and those of all the false ribs, into all the linea alba, and into the anterior part of the pubis. It divides into layers, the anterior passing before, the posterior, except at its lower part, behind the rectus abdominis to the linea alba. | To assist the former, and to bend the body in an opposite direction. |
|            | Transversalis Abdominis.                | Internally or posteriorly from the cartilages of the seven lower ribs, being there connected with the intercostals and diaphragm, also from the transverse process of the last vertebra of the back from those of the four upper vertebrae of the loins, from the inner edge of the crista ilii, and from part of Poupart's ligament. | Into the inferior bone of the sternum, and almost all the length of the linea alba.                                                                                                                                                                                                                                    | To compress the Abdomen.                                             |

| SITUATION. | NAME.             | ORIGIN.                                                                                                                                                           | INDEX.                                                                                                    | USE.                                                                        |
|------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Anteriorly | Rectus Abdominis. | From each side of the symphysis pubis. As it passes up it has four tendinous interseptions, and is sheathed by the tendons of the oblique and transverse muscles. | Joining fibres of the pectoral, it is inserted into the cartilages of the fifth, sixth, and seventh ribs. | To depress the trunk or to elevate the pelvis, and to compress the abdomen. |
| Anteriorly | Pyramidalis.      | Between the origin of the recti, from the symphysis pubis.                                                                                                        | About one-fourth up the linea alba, into it and the inner edge of the recti.                              | To assist the recti.                                                        |

*MUSCLES ARISING FROM THE RIBS AND VERTEBRÆ AND TERMINATING IN A CENTRAL TENDON ARE TWO IN NUMBER.*

| SITUATION. | NAME.                            | ORIGIN.                                                                                                                                                                               | INSERTION.                                                                                                                                                              | USE.                                                                                  |
|------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Superiorly | Greater Muscle of the Diaphragm. | From the cartilages of all the false and of the last true rib, also from the last bone of the sternum: it forms a septum between the thorax and abdomen, which is concave inferiorly. | In a central tendon, toward the right side of which is a triangular foramen for the vena cava inferior; to its upper part the pericardium and mediastinum are attached. | To act in respiration, and to expel the fœces and urine and the fœtus in parturition. |

## THE SAME CLASS CONTINUED.

| SITUATION.  | NAME.                                 | ORIGIN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | INSERTION.                          | USE.                  |
|-------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------|
| Posteriorly | Less Muscle<br>of the Dia-<br>phragm. | By eight commencements, from the second, third, and fourth lumbar vertebræ, which unite to form its crura, and between them pass the aorta and thoracic duct, on their outside the great sympathetic and some branches of the vena azygos, and about the middle of the fleshy belly of this muscle the œsophagus and eighth pair of nerves pass through a considerable foramen, called the left one to distinguish it from that situated toward the right of its tendinous center. | Into the middle tendon posteriorly. | To assist the former. |

## MUSCLE ARISING FROM THE PELVIS AND VERTEBRÆ AND INSERTED INTO THE RIBS AND VERTEBRÆ.

| SITUATION.  | NAME.                 | ORIGIN.                                                                                                                                        | INSERTION.                                                                                       | USE.                 |
|-------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------|
| Posteriorly | Longissimus<br>Dorsi. | From the spinous and transverse processes of the three upper false vertebræ, from the spinous and transverse processes of the lumbar vertebræ, | Into the transverse processes of the dorsal vertebræ, and into the lower ends of the false ribs. | To extend the trunk. |

| SITUATION.  | NAME.           | ORIGIN.                                     | INSERTION.                      | USE.                                             |
|-------------|-----------------|---------------------------------------------|---------------------------------|--------------------------------------------------|
| Posteriorly | Sacro-Lumbalis. | The same as that of the Longissimus, Dorsi. | Into the curvature of the ribs. | To pull down the ribs, and to elevate the trunk. |

N. This muscle has properly other origins, because from the upper part of several of the lower ribs arise as many small muscles, which being inserted into it are called *musculi accessori*.

### MUSCLE ARISING FROM THE PELVIS AND VERTEBRÆ AND INSERTED INTO THE VERTEBRÆ.

| SITUATION.  | NAME.             | ORIGIN.                                                                                                                                                                                                                                                                             | INSERTION.                                                            | USE.                    |
|-------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------|
| Posteriorly | Multifidus Spinæ. | From the posterior spine of the ilium, from the spinous and transverse processes of the upper false vertebræ, from the transverse and oblique processes of the lumbar vertebræ, from the transverse processes of the dorsal, and from those of the four inferior cervical vertebræ. | Into the spinous processes of all the true vertebræ except the first. | To extend the vertebræ. |



*MUSCLE ARISING FROM THE PELVIS AND INSERTED INTO THE RIBS.*

| SITUATION. | NAME.               | ORIGIN.                                     | INSERTION.                                                                                               | USE.                                                                         |
|------------|---------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Laterally  | Quadratus Lumborum. | From the posterior part of the crista ilii. | Into the last rib, the side of the last dorsal vertebra, and the transverse processes of all the lumbar. | To bend the trunk to one side, and when both act, to bend the trunk forward. |

*MUSCLES ARISING FROM THE VERTEBRÆ AND INSERTED INTO THE RIBS ARE SIX IN NUMBER.*

| SITUATION.             | NAME.             | ORIGIN.                                                                           | INSERTION.                                                                 | USE.                                                 |
|------------------------|-------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------|
| Laterally & Anteriorly | Scalenus Anticus. | From the transverse processes of the fourth, fifth, and sixth cervical vertebrae. | Into the upper side of the first rib near its cartilage.                   | To bend the neck or to elevate the ribs on one side. |
| Laterally              | Scalenus Medius.  | From the transverse processes of the cervical vertebrae.                          | Into the outer edge of the first rib till within an inch of its cartilage. | To assist the former.                                |
| Laterally              | Scalenus          | From the transverse pro-                                                          | Into the posterior part                                                    | To assist the                                        |

| SITUATION.                | NAME.                       | ORIGIN.                                                                                                                        | INSERTION.                                                          | USE.                                                 |
|---------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------|
| Posteriorly and Laterally | Cervicalis Descendens.      | From the transverse processes of the five inferior cervical vertebrae.                                                         | Into the six superior ribs.                                         | To turn the neck obliquely backward and to one side. |
| Posteriorly               | Serratus Superior Posticus. | From the spinous processes of the three last cervical and two uppermost dorsal vertebrae.                                      | Into the second, third, fourth, and fifth ribs.                     | To elevate the ribs.                                 |
| Posteriorly               | Serratus Inferior Posticus. | In common with the latissimus dorsi from the spinous processes of the two inferior dorsal and three superior lumbar vertebrae. | Into the under edges of the four lower ribs, near their cartilages. | To depress these ribs.                               |

*MUSCLES ARISING FROM THE VERTEBRÆ AND INSERTED INTO THEM ARE THIRTEEN IN NUMBER.*

| SITUATION. | NAME.         | ORIGIN.                                                                                                                                                              | INSERTION.                                                 | USE.                                             |
|------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------|
| Anteriorly | Longus Colli. | From the sides of the bodies of the three superior dorsal vertebrae, and from the roots of the transverse processes of the third, fourth, fifth, and sixth cervical. | Anteriorly, into the bodies of all the cervical vertebrae. | To bend the neck forward and somewhat laterally. |

## THE SAME CLASS CONTINUED.

| SITUATION.  | NAME.                      | ORIGIN.                                                                                                                                                               | INSERTION.                                                                                                          | USE.                                              |
|-------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Posteriorly | Splenius Cervicis.         | From the spinous processes of the third and fourth dorsal vertebrae.                                                                                                  | Into the transverse processes of the five superior cervical vertebrae.                                              | To extend the neck.                               |
| Posteriorly | Obliquus Capitis Inferior. | From the spinous process of the second dorsal vertebra.                                                                                                               | Into the transverse process of the first.                                                                           | To rotate the head.                               |
| Posteriorly | Transversalis Colli.       | From the transverse processes of the five upper dorsal vertebrae, being situated between the trachelo-mastoideus and the splenius cervicis and cervicalis descendens. | Into the transverse processes of the five middle cervical vertebrae.                                                | To turn the neck backward and somewhat laterally. |
| Posteriorly | Semi-Spinalis Colli.       | From the transverse processes of the six upper dorsal vertebrae.                                                                                                      | Into the spinous processes of the five middle cervical vertebrae.                                                   | To extend the neck obliquely backward.            |
| Posteriorly | Spinalis Dorsi.            | From the spinous processes of the two upper lumbar and three lower dorsal vertebrae.                                                                                  | Into the spinous processes of the second, third, fourth, fifth, sixth, seventh, eighth, and ninth dorsal vertebrae. | To extend the spine.                              |

| SITUATION.  | NAME.                                 | ORIGIN.                                                                                  | INSERTION.                                                                                    | USE.                            |
|-------------|---------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------|
| Posteriorly | Semi-Spinales Dorsi.                  | From the transverse processes of the seventh, eighth, ninth, and tenth dorsal vertebrae. | Into the spinous processes of the two inferior cervical and the seven upper dorsal vertebrae. | To extend the spine obliquely.  |
| Posteriorly | Interspinales Colli.                  | From the spinous process of one cervical vertebra.                                       | Into the spinous process of that next it.                                                     | To extend the neck.             |
| Posteriorly | Interspinales Dorsi et Lumborum.      | These seem rather ligamentous than muscular.                                             |                                                                                               |                                 |
| Laterally   | Intertransversales Colli et Lumborum. | From the transverse process of one cervical or lumbar vertebra.                          | Into the transverse process of that next it.                                                  | To approximate these processes. |
| Laterally   | Intertransversales Dorsi.             | These also seem ligamentous.                                                             |                                                                                               |                                 |

*MUSCLES ARISING FROM ONE RIB AND INSERTED INTO ANOTHER ARE OF TWO KINDS.*

| SITUATION. | NAME.                  | ORIGIN.                                                                 | INSERTION.                                                                | USE.                                |
|------------|------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------|
| Externally | Intercostales Externi. | From the inferior edge of one rib, between the spine and its cartilage. | Into the upper edge of another, their fibres running from behind forward. | To elevate the ribs in inspiration. |
| Internally | Intercostales Interni. | From the inferior edge of one rib between the sternum and its angle.    | Like that of the external. They run from before backward.                 | The same.                           |

*MUSCLE FROM THE STERNUM TO THE RIBS.*

| SITUATION. | NAME.            | ORIGIN.                                                                                | INSERTION.                                                                                                    | USE.                                               |
|------------|------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Internally | Sterno-Costalis. | From the edge of the last, and of the inferior half of the middle bone of the sternum. | Its fibres ascending are fixed into the inferior edge of the cartilages of the third, fourth, and fifth ribs. | To depress the cartilages and contract the thorax. |

## MUSCLE ARISING FROM THE VERTEBRÆ AND INSERTED INTO THE PELVIS.

| SITUATION.                      | NAME.         | ORIGIN.                                                             | INSERTION.                                                            | USE.                               |
|---------------------------------|---------------|---------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------|
| Internally<br>and<br>Anteriorly | Psoas Parvus. | Laterally from the bodies of<br>the two upper lumbar verte-<br>bræ. | Into the brim of the<br>pelvis opposite the acetabulum<br>internally. | To aid in<br>bending the<br>loins. |

MUSCLES ARISING FROM ONE PART OF THE PELVIS AND INSERTED INTO ANOTHER  
ARE TWO IN NUMBER.

| SITUATION.                      | NAME.                 | ORIGIN.                                                                                  | INSERTION.                                                                                                          | USE.                          |
|---------------------------------|-----------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Laterally<br>and<br>Anteriorly. | Coccygeus.            | From the spine of the ischium<br>and the inside of the less<br>sacro-ischiatic ligament. | Into the edge of the os<br>coccygis.                                                                                | To pull that<br>bone forward. |
| Anteriorly                      | Curvator<br>Coccygis. | Internally, from the last<br>bone of the os sacrum and the<br>first of the os coccygis.  | Having joined its fellow,<br>into the second, third, but<br>principally into the fourth<br>bone of the os coccygis. | To curve the<br>os coccygis.  |

MUSCLES OF THE MALE ORGANS OF GENERATION AND ANUS.

MUSCLE ARISING FROM THE OBLIQUUS INTERNUS ABDOMINIS AND INSERTED INTO THE TESTIS.

| SITUATION. | NAME.     | ORIGIN.                                                                                                          | INSERTION.                               | USE.                   |
|------------|-----------|------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------|
| Anteriorly | Cremaster | From the internal oblique about the abdominal ring through which it passes and descends upon the spermatic cord. | Into the tunica vaginalis of the testis. | To elevate the testis. |

That which was called Dartos and supposed to be a muscle of the scrotum, appears to be merely membranous.

MUSCLES ARISING FROM THE TUBER ISCHII AND INSERTED ABOUT THE PENIS ARE THREE IN NUMBER.

| SITUATION. | NAME.          | ORIGIN.                                                                     | INSERTION.                         | USE.                                   |
|------------|----------------|-----------------------------------------------------------------------------|------------------------------------|----------------------------------------|
| Laterally  | Erector Penis. | From the tuber ischii and, in its ascent, surrounding the whole crus penis. | Near the union of the crura penis. | To direct, if not to erect, the penis. |



| SITUATION.                      | NAME.                         | ORIGIN.                                                        | INSERTION.                                                                                           | USE.                                                         |
|---------------------------------|-------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Posteriorly<br>and<br>Laterally | Transversus<br>Perinei.       | From the tuber ischii passing transversely inward and forward. | Into the accelerator urinae, and the sphincter ani where the above-mentioned muscle covers the bulb. | To dilate the bulb, while it draws up the verge of the anus. |
| Posteriorly<br>and<br>Laterally | Transversus<br>Perinei Alter. | Behind the former, but runs more forward.                      | Into the accelerator where it covers the bulb anteriorly.                                            | To assist the former.                                        |

## MUSCLE ARISING FROM ONE PART OF THE PENIS AND INSERTED INTO ANOTHER.

| SITUATION.  | NAME.                                        | ORIGIN.                                                                 | INSERTION.                                           | USE.                  |
|-------------|----------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------|-----------------------|
| Surrounding | Accelerator<br>urinae or Ejaculator Seminis. | From the sphincter ani, membranous part of the urethra, and crus penis. | Into the middle of the bulb completely enclosing it. | To compress the bulb. |

*MUSCLE ARISING FROM THE PUBIS AND INSERTED ABOUT THE PROSTATE GLAND.*

| SITUATION.  | NAME.                | ORIGIN.                                                                                                                                        | INSERTION.                                                     | USE.                                           |
|-------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------|
| Surrounding | Compressor Prostatæ. | Above the levator ani from the internal part of the os pubis, between the lower part of the symphysis and the upper part of the foramen ovale. | Between the prostate and rectum, having surrounded the former. | To compress the inferior part of the prostate. |

*MUSCLES ARISING FROM THE PELVIS AND INSERTED ABOUT THE ANUS ARE TWO IN NUMBER.*

| SITUATION. | NAME.                   | ORIGIN.                                                                                                                                                                                      | INSERTION.                                                                                                                                                                             | USE.                                                       |
|------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Superiorly | Levator Ani.            | From the spina of the ischium, from the membrane covering the coccygeus and obturator internus, from the junction of the pubis and ischium, and from the pubis above the foramen thyroideum. | Surrounding the neck of the bladder, prostate, vesiculæ seminales and the termination of the rectum, it is fixed to the sphincter ani, acceleratores urinæ and tip of the os coccygis. | To elevate the anus.                                       |
| Laterally  | Sphincter Ani Externus. | From the tip of the os coccygis, surrounding the anus.                                                                                                                                       | Into the perineum, transversi perinei, and acceleratores urinæ.                                                                                                                        | To shut the anus and to pull down the bulb of the urethra. |

N. The sphincter internus may be considered as that part of the fibres of the rectum which surrounds its extremity.

# MUSCLES OF THE FEMALE ORGANS OF GENERATION AND ANUS.

## MUSCLES OF THE FEMALE ORGANS, &c.

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### MUSCLE ARISING FROM THE ISCHIUM AND INSERTED INTO THE CLITORIS.

| SITUATION.               | NAME.               | ORIGIN.                                                                                                       | INSERTION.                                                | USE.                                        |
|--------------------------|---------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------|
| Laterally and Inferiorly | Erector Clitoridis. | From the inner side of the crus of the ischium, embracing the crus of the clitoris as far up as the os pubis. | Into the upper part of the crus and body of the clitoris. | To draw the clitoris downward and backward. |

### MUSCLE ARISING FROM THE CLITORIS AND INSERTED INTO THE VAGINA.

| SITUATION.  | NAME.              | ORIGIN.                                 | INSERTION.                                                     | USE.                                 |
|-------------|--------------------|-----------------------------------------|----------------------------------------------------------------|--------------------------------------|
| Surrounding | Sphincter Vaginae. | From the union of the crura clitoridis. | Into the sphincter and sides of the vagina which it surrounds. | To contract the mouth of the vagina. |

### MUSCLE ARISING FROM THE TUBER ISCHII AND INSERTED INTO THE PERINEUM.

| SITUATION.                | NAME.                | ORIGIN.                                                            | INSERTION.                                                                   | USE.                     |
|---------------------------|----------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------|
| Posteriorly and Laterally | Transversus Perinei. | From the cellular membrane covering the tuberosity of the ischium. | Into the perineum between the pudendum and anus, and into the sphincter ani. | To sustain the perineum. |

*MUSCLE ARISING FROM THE TUBER ISCHII AND INSERTED INTO THE VAGINA.*

| SITUATION.                      | NAME.                         | ORIGIN.                       | INSERTION.                   | USE.                  |
|---------------------------------|-------------------------------|-------------------------------|------------------------------|-----------------------|
| Posteriorly<br>and<br>Laterally | Transversus<br>Perinei Alter. | Resembles that of the former. | Into the side of the vagina. | To assist the former. |

*MUSCLE ARISING FROM ONE PART OF THE PUBIS AND INSERTED INTO ANOTHER.*

| SITUATION.        | NAME.                 | ORIGIN.                                                                 | INSERTION.      | USE.                    |
|-------------------|-----------------------|-------------------------------------------------------------------------|-----------------|-------------------------|
| Trans-<br>versely | Depressor<br>urethræ. | Arises from one crus of the pubis involving the urethra and is inserted | Into the other. | To depress the urethra. |

*MUSCLES ARISING FROM THE PELVIS AND INSERTED ABOUT THE ANUS ARE TWO  
IN NUMBER.*

| SITUATION. | NAME.        | ORIGIN.                                                                        | INSERTION.                                                                  | USE.                              |
|------------|--------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------|
| Superiorly | Levator Ani. | As in the male, and descends along the inferior part of the vagina and rectum. | Into the perineum, sphincter ani, and extremities of the rectum and vagina. | To elevate the rectum and vagina. |

| SITUATION. | NAME.                   | ORIGIN.                                                                | INSERTION.         | USE.                                                                          |
|------------|-------------------------|------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------|
| Laterally. | Sphincter Ani Externus. | As in the male, from the tip of the os coccygis, surrounding the anus. | Into the perineum. | To shut the rectum, and by pulling down the perineum, to contract the vagina. |

The Sphincter internus exactly resembles that of the male.

## MYOLOGY.

## MUSCLES OF THE HEAD, FACE, &amp;c.

MUSCLE ARISING FROM THE INTEGUMENTS OF THE BREAST AND SHOULDER  
AND INSERTED INTO THOSE OF THE FACE.

| SITUATION. | NAME.                | ORIGIN.                                                                                                                                                               | INSERTION.                                                                                                                    | USE.                                                                 |
|------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Anteriorly | Platysma<br>Myoides. | From the cellular substance covering the deltoid and pectoral muscles superiorly, passing upward in a very thin layer almost immediately under the cutis of the neck. | Into the skin covering the lower jaw between its angle and the chin, also into that covering the masseter and parotid glands. | To approximate the portions of integument into which it is inserted. |

MUSCLES ARISING FROM THE STERNUM, RIBS, OR VERTEBRÆ, AND INSERTED INTO THE HEAD, ARE TEN IN NUMBER.

| SITUATION. | NAME.                         | ORIGIN.                                                                                                                                             | INSERTION.                                                   | USE.                                              |
|------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------|
| Anteriorly | Sterno-Cleido-<br>Mastoideus. | By two commencements, one from the top of the sternum laterally, the other from the upper anterior part of the clavicle, uniting, they are inserted | Into the mastoid process as far back as the lambdoid suture. | To turn the head on one side and bend it forward. |

| SITUATION.  | NAME.                         | ORIGIN.                                                                                                                                                              | INSERTION.                                                                                                                                 | USE.                                       |
|-------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Anteriorly  | Rectus Capitis Anticus Major. | From the anterior points of the transverse processes of the third, fourth, fifth, and sixth cervical vertebrae, by distinct commencements.                           | Into the basilar process of the occipital bone a short space before the condyles.                                                          | To bend the head forward.                  |
| Anteriorly  | Rectus Capitis Anticus Minor. | Anteriorly from the body of the first vertebra of the neck, opposite its superior oblique processes.                                                                 | Near the root of the condyles of the os occipitis, further outward than the former muscle.                                                 | To nod the head.                           |
| Laterally   | Rectus Capitis Lateralis.     | Anteriorly, from the point of the transverse process of the first vertebra of the neck.                                                                              | Into the ridge of the os occipitis external to the condyles.                                                                               | To bend the head to one or the other side. |
| Posteriorly | Splenius Capitis.             | From the five inferior cervical spines, and the ligamentum nuchæ. They recede from each other at the third vertebra of the neck and show between them the complexus. | Into the hollow of the os occipitis below its transverse ridge and externally to the complexus, also into the mastoid process posteriorly. | To pull the head backward laterally.       |



## THE SAME CLASS CONTINUED.

| SITUATION.  | NAME.                             | ORIGIN.                                                                                                                                                        | INSERTION.                                                                   | USE.                                                          |
|-------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------|
| Posteriorly | Complexus.                        | From the transverse processes of the four inferior cervical vertebræ and of the seven superior dorsal, also from the spinous process of the first dorsal.      | Into the hollow of the os occipitis below its transverse ridge.              | To pull the head backward laterally.                          |
| Posteriorly | Trachelo-<br>Mastoideus.          | From the transverse processes of the five inferior cervical vertebræ, where it is connected with the transversalis cervicis, and of the three superior dorsal. | Into the middle of the posterior part of the mastoid process.                | To pull the head backward but more laterally than the former. |
| Posteriorly | Rectus Capitis<br>Posticus Major. | From the external part of the spine of the second cervical vertebra.                                                                                           | Into the os occipitis about an inch behind the foramen magnum.               | To pull the head backward and a little laterally.             |
| Posteriorly | Obliquus Capitis<br>Superior.     | From the transverse process of the first cervical vertebra.                                                                                                    | Into the os occipitis externally to the last muscle and below the complexus. | To pull the head backward.                                    |
| Posteriorly | Rectus Capitis<br>Posticus Minor. | From the middle of the posterior arch of the atlas.                                                                                                            | Into a depression immediately behind the foramen                             | To pull the head backward.                                    |

| SITUATION. | NAME.                  | ORIGIN.                                                                                                                                                                                                                                         | INSERTION.                                                                                                                            | USE.                                                                                    |
|------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Superiorly | Occipito-Frontalis.    | Posteriorly, from the transverse ridge of the os occipitis, becoming tendinous as it passes upward over the cranium; it is connected to the Temporalis, the Attolens Aures and the Zygoma, and advancing to the brow it becomes again muscular. | Into the orbicularis and the skin of the eyebrows.                                                                                    | To raise the eyebrows, and to pull backward or to wrinkle the skin of the head.         |
| Anteriorly | Corrugator Supercilii. | From the internal angular process of the os frontis, thence running outward and upward.                                                                                                                                                         | Extending as far outward as the middle of the supercilia, it is inserted internally into the inferior part of the occipito frontalis. | To draw the eyebrows, together, and to wrinkle the skin of the forehead longitudinally. |

MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE EYE-LIDS ARE TWO IN NUMBER.

| SITUATION. | NAME.                        | ORIGIN.                                                                                                                                              | INSERTION.                                            | USE.                                                                                                                 |
|------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Superiorly | Levator Palpebræ Superioris. | From the upper part of the foramen opticum of the os sphenoides, above the levator oculi.                                                            | Into the tarsus of the upper eyelid.                  | To pull the eyelid upward.                                                                                           |
| Anteriorly | Orbicularis Palpebrarum.     | At the inner angle of the eye, from the outside of the nasal process of the superior maxillary bone, and surrounding the eye externally, is inserted | Where it arose, having passed over the lachrymal sac. | To shut the eye, press the eyeball, squeeze the lachrymal gland, and convey the tears toward the puncta lachrymalia. |

MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE EYE-BALL ARE SIX IN NUMBER.

| SITUATION. | NAME.          | ORIGIN.                                                                                                 | INSERTION.                                             | USE.                            |
|------------|----------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------------------------|
| Superiorly | Levator Oculi. | From the upper part of the foramen opticum of the sphenoid bone beneath the levator palpebræ superioris | Into the superior anterior part of the sclerotic coat. | To elevate the ball of the eye. |

| SITUATION.                | NAME.                             | ORIGIN.                                                                                                                                                                                                                                                              | INSERTION.                                                                                  | USE.                                                                                                                                   |
|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Inferiorly                | Depressor Oculi.                  | From the inferior part of the foramen opticum.                                                                                                                                                                                                                       | Opposite to the former.                                                                     | To depress the ball of the eye.                                                                                                        |
| Internally                | Adductor Oculi.                   | From the edge of the foramen opticum, between the obliquus superior and the depressor.                                                                                                                                                                               | Opposite to the inner angle.                                                                | To adduct or turn the eye toward the nose.                                                                                             |
| Externally                | Abductor Oculi.                   | From the outer edge of the foramen opticum.                                                                                                                                                                                                                          | Opposite to the outer angle.                                                                | To abduct or turn the eye toward the temple.                                                                                           |
| Superiorly and Internally | Trochlearis or Obliquus Superior. | From the edge of the foramen opticum, between the levator and adductor oculi, thence turning to the cartilaginous trochlea on the inside of the internal angular process of the os frontis, it passes through it and turns its course downward, outward and backward | Into the sclerotic coat, half way between the insertion of the levator and the optic nerve. | To roll the ball of the eye from above inwardly, to pull it forward and inward and upward, and to turn the pupil downward and outward. |

THE SAME CLASS CONTINUED.

| SITUATION.                | NAME.                    | ORIGIN.                                                                                                                                                           | INSERTION.                                                        | USE.                                                                                                                               |
|---------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Inferiorly and Internally | Obliquus Inferior Oculi. | From the outer edge of the orbital process of the superior maxillary bone near the depression for the lachrymal duct, running outward and backward it is inserted | Into the sclerotic coat between the abductor and the optic nerve. | To roll the ball of the eye from above outwardly, to pull it forward inward and downward, and to turn the pupil upward and inward. |

MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE EXTERNAL EAR ARE THREE IN NUMBER.

| SITUATION. | NAME.           | ORIGIN                                                                              | INSERTION.                               | USE.                     |
|------------|-----------------|-------------------------------------------------------------------------------------|------------------------------------------|--------------------------|
| Superiorly | Attolens Aurem. | From the tendon of the occipito-frontalis where it covers the temporal aponeurosis. | Superiorly, into the back of the concha. | To elevate the ear.      |
| Anteriorly | Anterior Auris. | From the posterior part of the zygoma.                                              | Anteriorly, into the back of the helix.  | To pull the ear forward. |

*MUSCLES ARISING FROM ONE PART OF THE PINNA OF THE EXTERNAL  
EAR AND INSERTED INTO ANOTHER ARE FIVE IN NUMBER*

| SITUATION.  | NAME.                 | ORIGIN.                                                                                 | INSERTION.                                        | USE.                                                                          |
|-------------|-----------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------|
| Posteriorly | Retrahentes<br>Auris. | Often by three origins from<br>the external part of the root of<br>the mastoid process. | Posteriorly, into the back<br>edge of the concha. | To pull the<br>ear backward.                                                  |
| Anteriorly  | Helicis<br>Major.     | From the acute process of the<br>helix,                                                 | Into the helix a little<br>higher up.             | To contract that<br>part of the helix.                                        |
| Anteriorly  | Helicis<br>Minor.     | From the inferior anterior<br>part of the helix nearer its edge<br>than the former,     | Into the helix a little<br>higher up.             | To bring to-<br>gether the edges<br>of a fissure over<br>which it passes.     |
| Anteriorly  | Tragicus.             | Anteriorly, from the middle<br>of the anterior edge of the<br>concha,                   | Into the tip of the tragus.                       | To pull the<br>point of the tra-<br>gus forward.                              |
| Posteriorly | Anti-Tra-<br>gicus.   | From the termination of the<br>anti-helix,                                              | Into the tip of the anti-<br>tragus.              | Approximates<br>these points by<br>shutting the fis-<br>sure between<br>them. |



## THE SAME CLASS CONTINUED.

| SITUATION.  | NAME.              | ORIGIN.                                                         | INSERTION.                                                                                                | USE.                           |
|-------------|--------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------|
| Posteriorly | Transversus Auris. | From the superior and posterior edge of the back of the concha, | Superiorly into the back of the fossa navicularis, and posteriorly into the back of the fossa innominata. | To approximate these cavities. |

MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE OSSICULA AUDITUS ARE FOUR IN NUMBER.

| SITUATION. | NAME.                  | ORIGIN.                                                                                                                                              | INSERTION.                                                                 | USE.                                                        |
|------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------|
| Anteriorly | Laxator Tympani Major. | From the styloid process of the sphenoid bone, running backward it passes through the fissura glasseri                                               | Into the long process of the malleus where it rests upon the same fissure. | To pull the malleus and membranatympani obliquely forward.  |
| Superiorly | Laxator Tympani Minor. | From the superior posterior margin of the meatus auditorius, where the membrana tympani adheres to it, descending inward and forward, it is inserted | Into the neck of the malleus near its short process.                       | To pull the malleus and membranatympani forward and upward. |



| SITUATION.  | NAME.           | ORIGIN.                                                                                                                                                                                                                                    | INSERTION.                                                         | USE.                                             |
|-------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------|
| Internally  | Tensor Tympani. | From the cartilaginous end of the Eustachian trumpet and styliform process of the sphenoid bone, thence running back above the osseous part of the Eustachian tube within a thin osseous plate, it makes a turn forward into the tympanum. | Posteriorly into the handle of the malleus below its long process. | To pull the malleus and membrana tympani inward. |
| Posteriorly | Stapedius.      | From a hollow pyramid on the posterior side of the tympanum, before the lower end of the Fallopiian aqueduct,                                                                                                                              | Into the posterior part of the head of the stapes.                 | To pull the stapes upward and backward.          |

*MUSCLE ARISING FROM ONE PART OF THE NASAL CARTILAGE AND INSERTED INTO ANOTHER.*

| SITUATION. | NAME.             | ORIGIN.                                              | INSERTION.         | USE.                 |
|------------|-------------------|------------------------------------------------------|--------------------|----------------------|
| Laterally  | Compressor Naris. | From the superior part of the cartilage of the nose, | Into the inferior. | To compress the alæ. |

*MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE NOSE  
AND LIPS ARE TWO IN NUMBER.*

| SITUATION. | NAME.                                               | ORIGIN.                                                                                                                                                     | INSERTION.                                                                                                           | USE.                                                      |
|------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Laterally  | Levator Labii<br>Superioris<br>Alaque<br>Nasi.      | By two commencements, one from the external edge of the orbital process of the superior maxillary bone, the other from the upper part of its nasal process. | The first into the upper lip and orbicularis labiorum, the second into the upper lip and outer part of the ala nasi. | To elevate the upper lip and ala nasi.                    |
| Laterally  | Depressor<br>Labii<br>Superioris<br>Alaque<br>Nasi. | From the depression of the os maxillare superius above the dentes incisivi and caninus, thence running up under the levator,                                | Into the upper lip and root of the ala nasi.                                                                         | To draw the upper lip and ala nasi downward and backward. |

*MUSCLE ARISING FROM THE NOSE AND INSERTED INTO THE UPPER LIP.*

| SITUATION. | NAME.                           | ORIGIN.                                                                          | INSERTION.                 | USE.                                                                       |
|------------|---------------------------------|----------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------|
| Anteriorly | Nasalis<br>Labii<br>Superioris. | From the tip and septum of the nose, enlarging and descending obliquely outward, | Into the orbicularis oris. | To bring closer the angles of the mouth or to depress the tip of the nose. |

MUSCLES ARISING FROM THE CRANIUM AND INSERED INTO THE FACE  
ARE SIX IN NUMBER.

| SITUATION.                | NAME.                       | ORIGIN.                                                                                                                                                                                                                          | INSERTION.                                               | USE.                                                                   |
|---------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------|
| Laterally and Anteriorly  | Depressor Labii Inferioris. | Anteriorly, from the inferior part of the lower jaw,                                                                                                                                                                             | Into the edge of the under lip.                          | To depress the under lip.                                              |
| Laterally and Anteriorly. | Levator Labii Inferioris.   | From the depression of the os maxillare inferius below the dentes incisivi and caninus,                                                                                                                                          | Into the under lip and skin of the chin.                 | To pull these parts upward.                                            |
| Laterally                 | Depressor Anguli Oris.      | From the inferior edge of the maxilla inferior by the side of the chin, becoming gradually narrower it is connected externally to the integuments and to the platysma myoides, and internally to the depressor labii inferioris. | Into the angle of the mouth.                             | To pull down the angle of the mouth.                                   |
| Laterally                 | Buccinator.                 | From the upper jaw behind its dens sapientie, where it is connected with the constrictor pharyngis superior, and from the lower jaw as far back as its dens sapientie and the root of its coronoid process,                      | Into the angle of the mouth within the orbicularis oris. | To pull the angle of the mouth backward and to press the cheek inward. |

## THE SAME CLASS CONTINUED.

| SITUATION. | NAME.                 | ORIGIN.                                       | INSERTION.                                          | USE.                                                             |
|------------|-----------------------|-----------------------------------------------|-----------------------------------------------------|------------------------------------------------------------------|
| Laterally  | Zygomaticus<br>Major. | From the zygomatic process<br>of the os male, | Into the angle of the<br>mouth.                     | To draw up-<br>ward and out-<br>ward the corner<br>of the mouth. |
| Laterally  | Zygomaticus<br>Minor. | From above the origin of the<br>former,       | Into the upper lip near the<br>corner of the mouth. | To draw up-<br>ward and out-<br>ward the corner<br>of the mouth. |

*MUSCLE ARISING AT ONE PART OF THE LIPS AND INSERTED AT ANOTHER.*

| SITUATION. | NAME.                | ORIGIN.                                                                                                                                                                                 | INSERTION.                                 | USE.                                              |
|------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------|
| Anteriorly | Orbicularis<br>Oris. | From the other muscles of<br>the lips, the fibres of the su-<br>perior descending, those of the<br>inferior ascending, and decus-<br>sating each other about the<br>angle of the mouth, | Into the fibres from the<br>opposite side. | To shut the<br>mouth and<br>compress the<br>lips. |

*MUSCLE ARISING FROM ONE PART OF THE UPPER JAW AND INSERTED INTO ANOTHER.*

| SITUATION. | NAME.                               | ORIGIN.                                                             | INSERTION.                                                                         | USE.                                                                                        |
|------------|-------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Laterally  | Anomalous<br>Maxillæ<br>Superioris. | From the upper part of the fossa of the cupidatus of the upper jaw, | Below the origin of the first portion of the levator labii superioris alæqui nasi. | From the attachment of both its ends to one bone it can act only on the vessels and nerves. |

*MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE LOWER JAW ARE FIVE IN NUMBER.*

| SITUATION. | NAME.       | ORIGIN.                                                                                                                                                             | INSERTION.                                    | USE.                                       |
|------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------|
| Laterally  | Temporalis. | From the temporal ridge and depression of the os frontis and os parietale, from the temporal process of the sphenoid bone and from the aponeurosis which covers it, | Around the coronoid process of the lower jaw. | To pull the lower jaw upward and backward. |

## THE SAME CLASS CONTINUED.

| SITUATION. | NAME.                     | ORIGIN.                                                                                                                                                                                                | INSERTION.                                                                                                                            | USE.                                                                                      |
|------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Laterally  | Masseter.                 | From the superior maxillary bone where it joins the os malæ, and from the inferior and interior part of the zygoma throughout its length, the external fibres slanting backward, the internal forward, | Into the outside of the angle and ramus of the lower jaw.                                                                             | To elevate the lower jaw and to pull it a little forward or backward.                     |
| Anteriorly | Pterygoideus<br>Externus. | From the outside of the external pterygoid process of the sphenoid bone, from part of the tuberosity of the os maxillare and from the root of the temporal process of the sphenoides,                  | Into a cavity on the anterior part of the neck of the condyloid process of the lower jaw and into the capsular ligament of the joint. | To pull the jaw forward and to the opposite side and to pull the ligament from the joint. |
| Internally | Pterygoideus<br>Internus. | From the pterygoid fossa of the sphenoid and palate bones,                                                                                                                                             | Into the angle of the lower jaw internally.                                                                                           | To pull the jaw upward and toward the other side.                                         |

| SITUATION.                     | NAME.       | ORIGIN.                                                                                                                                                                                                                     | INSERTION.                                               | USE.                                                                                                                     |
|--------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Inferiorly<br>and<br>Laterally | Digastricus | From the deep fossa at the root of the mastoid process of the temporal bone, becoming tendinous in its middle it perforates the stylo-hyoideus and is fixed by a ligament to the os hyoides, again ascending it is inserted | Into a rough sinuosity at the inferior edge of the chin. | To depress the lower jaw and open the mouth, but, when the jaw is fixed, to raise the larynx and pharynx in deglutition. |



## DESCRIPTION OF THE LARYNX AND PHARYNX.

### LARYNX.

The Larynx is composed of Five Cartilages, viz. the *Thyroid*, which is altogether situated anteriorly, and is the largest ; the *Cricoid*, of a ring-like form, situated inferiorly with its largest side turned backward ; upon this largest side of the cricoid, the two *Arytænoid* are placed posteriorly ; and the *Epiglottis* is situated anteriorly and above the others.

#### THE THYROID CARTILAGE

Is divided by a middle convexity into two *Alæ* or Wings, which fold backward. Its inferior edge is straight and terminates in points termed the *Cornua* of the os hyoides which turn downward. Its superior edge is cordiform, having a notch in the middle and elevations on each side : it terminates similarly in cornua which are longer than the inferior ones. Its posterior edge is altogether straight. On the outside of each alæ an oblique line runs from near the upper corner forward and downward, commencing and terminating by small knobs for the purpose of muscular attachment.

#### THE CRICOID

Resembles a ring which is broad on one side and narrow on the other. Its broadest side is turned backward. The convex surface of this is marked by a middle longitudinal line with slight depressions on each side of it where muscles are fixed. The top of this posterior portion is elevated and slopes down-

ward and outward on each side for a short way, when it forms an obtuse angle with the sides of the cartilage which slope still more. These angles are marked by smooth articular surfaces for the arytenoid cartilages, and from them prominent lines proceed downward on the convex surface, and terminate in articular surfaces for the inferior cornua of the thyroid.

### THE ARYTENOID

Are two small curved and somewhat pyramidical bodies placed on the posterior part of cricoid. They possess broad bases and narrow extremities, a posterior concave side and an anterior convex one, an external oblique edge and an internal straight one. These cartilages are situated at a little distance from each other.

### THE EPIGLOTTIS

In shape somewhat resembles the cartilago unciformis of the sternum, being narrow at its base, while its upper part is thin and flat, with convex edges. This cartilage is highly elastic, and is concave upon its anterior surface and convex upon its posterior. It is situated above the middle of the thyroid.

### THE LIGAMENTS OF THE LARYNX.

One pair of round ligaments connects the tips of the cornua or horn-like extremities of the os hyoides with the superior cornua of the thyroid; a short and strong ligament connects the body of the os hyoides to the notch of the thyroid, from which a ligament proceeds to the epiglottis, and from the epiglottis another proceeds to the body of the os hyoides: these three leave between them a triangular space filled with cellular substance. The lateral ligaments of the epiglottis connect it to the tips of the arytenoid cartilages, and its membranes

connect it anteriorly to the tongue and on each side to the amygdalæ.

The inferior cornua of the thyroid cartilage are connected to the inferior articular surfaces of the cricoid by short strong ligaments, and the inferior edge of the former is also tied by a strong ligament to the superior part of the latter. From the middle of the back of the thyroid, ligaments also proceed which shall be mentioned below.

The base of the cricoid cartilage is fixed by a circular ligament to the first cartilaginous ring of the trachea, and its superior posterior part is connected by ligaments to the bases of the arytænoids.

### THE GLOTTIS

Is formed by two small ligaments, which proceeding from the anterior part of the base of the arytænoid cartilages, are fixed together into the concave middle of the posterior side of the thyroid. Beneath these immediately two other similar ligaments are situated, leaving a narrow fissure between themselves and the former. Within this fissure a small sac on each side is placed.

This ligamentous and chondral apparatus constitutes a part of the organ of voice.

### PHARYNX.

The Pharynx is a muscular bag situated before the cervical vertebræ below the basilar process of the os occipitis, and behind the nares, mouth, and larynx, terminating inferiorly in the pharynx. It is throughout glandular.

The Pharynx may be divided into three portions; the Superior which is its *Arch*, the Middle which is its *Body*, and the

inferior which is its *Sphincter*. The Body of the Pharynx behind the upper part of the Larynx is considerably wide, above this it is contracted on each side, and at its superior part or Arch it is extremely wide. There it extends almost from the styloid process on the one side to the same process on the other. Immediately behind the larynx it is loose and forms itself into folds; it forms also deep folds immediately before the Atlas.

The Superior part of the Pharynx constitutes a portion of the Organ of Voice, while the whole of it is the immediate organ of Deglutition.

# MUSCLES OF THE ORGANS OF VOICE AND DEGLUTITION.

## MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE LARYNX\* ARE FOUR IN NUMBER.

| SITUATION.                         | NAME.           | ORIGIN.                                                                                                                   | INSERTION.                                                        | USE.                                                   |
|------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------|
| Superiorly                         | Digastricus.    | From its more important use, is described above.                                                                          |                                                                   |                                                        |
| Laterally and Superiorly           | Stylo-Hyoideus. | From the middle and inferior part of the styloid process,                                                                 | At the junction of the base and cornu of the os hyoides.          | To pull the os hyoides laterally and upward.           |
| Superiorly, Anteriorly & Laterally | Mylo-Hyoideus.  | From all the inside of the lower jaw, between the last dens molaris and the middle of the chin where it joins its fellow, | Into the middle of the base of the os hyoides.                    | To pull the os hyoides forward, upward, and laterally. |
| Superiorly and Anteriorly          | Genio-Hyoideus. | From a rough protuberance in the middle of the inside of the chin,                                                        | Into the middle of the upper part of the basis of the os hyoides. | To pull the os hyoides forward.                        |

\* The os hyoides is here considered as belonging to the Larynx.

ARE TWO IN NUMBER.

| SITUATION. | NAME.              | ORIGIN.                                                                                             | INSERTION.                                                                           | USE.                                    |
|------------|--------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------|
| Inferiorly | Sterno-Hyoideus.   | From the junction of the sternum and clavicle and from the cartilage of the first rib,              | Into the middle of the lower part of the basis of the os hyoides.                    | To pull the os hyoides downward.        |
| Inferiorly | Sterno-Thyroideus. | From the edge of the upper bone of the sternum opposite the cartilage of the first rib, internally, | Into the rough line at the external part of the lower edge of the thyroid cartilage. | To pull the thyroid cartilage downward. |

MUSCLE ARISING FROM THE SHOULDER AND INSERTED INTO THE LARYNX.

| SITUATION.               | NAME.         | ORIGIN.                                                                                                                                                                                         | INSERTION.                                                       | USE.                                       |
|--------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------|
| Laterally and Inferiorly | Omo-Hyoideus. | From about the semilunar notch of the superior costa of the scapula, ascending upward and forward below the sternocleido-mastoideus, it becomes tendinous, and again growing fleshy is inserted | Into the sides of the lower part of the basis of the os hyoides. | To pull the os hyoides obliquely downward. |

MUSCLES ARISING FROM THE LARYNX AND INSERTED INTO ITSELF ARE  
NINE IN NUMBER.

| SITUATION.                     | NAME.                               | ORIGIN.                                                                                                            | INSERTION.                                                                                                     | USE.                                                                                               |
|--------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Inferiorly<br>and<br>Laterally | Thyreo-<br>Hyoideus.                | From a rough line upon the<br>external part of the thyroid<br>cartilage,                                           | Into part of the basis<br>and all the cornu of the<br>os hyoides externally.                                   | To pull the os<br>hyoides down-<br>ward or the<br>thyroid carti-<br>lage upward.                   |
| Anteriorly                     | Musculus<br>Glandulae<br>Thyroideæ. | From the lower edge of the ba-<br>sis of the os hyoides, crossing the<br>thyroid cartilage it is inserted          | Into the middle of the<br>thyroid gland.                                                                       | To pull the<br>gland toward<br>the os hyoides.                                                     |
| Laterally                      | Crico-<br>Thyroideus.               | From the anterior and late-<br>ral parts of the cricoid carti-<br>lage, running obliquely up-<br>ward and outward, | By two terminations, one<br>into the base of the thy-<br>roid cartilage, the other<br>into its inferior cornu. | To pull down-<br>ward and for-<br>ward the thy-<br>roid, or upward<br>and backward<br>the cricoid. |
| Posteriorly                    | Crico-Arytæn-<br>oideus Posticus.   | From the posterior part of the<br>cricoid cartilage,                                                               | Posteriorly into the base<br>of the arytenoid.                                                                 | To pull back<br>the arytenoid<br>cartilages and<br>to open the ri-<br>ma glottidis.                |



| SITUATION.  | NAME.                               | ORIGIN.                                                                                                                           | INSERTION.                                                                     | USE.                                                                                     |
|-------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Laterally   | Crico-<br>Arytænoides<br>Lateralis. | From the side of the cricoid cartilage where it is covered by the thyroid,                                                        | Into the side of the base of the arytenoid.                                    | To open the rima glottidis.                                                              |
| Posteriorly | Thyreo-<br>Arytænoides<br>Major.    | From the inferior posterior part of the body of the thyroid cartilage, running upward and backward along the side of the glottis, | Into the arytenoid cartilage above and before the crico-arytænoides lateralis. | To pull forward the arytenoid toward the middle of the thyroid and to relax the glottis. |
| Posteriorly | Thyreo-<br>Arytænoides<br>Minor.    | From the thyroid cartilage near its incisura cordiformis,                                                                         | Into the arytenoid cartilage.                                                  | The same as the former.                                                                  |
| Internally  | Arytænoides<br>Obliquus.            | From the base of one arytenoid cartilage, crossing its fellow,                                                                    | Into the tip of the other.                                                     | To approximate the arytenoid cartilages.<br><i>N. Often one is wanting.</i>              |
| Internally  | Arytænoides<br>Transversus.         | From the side of one arytenoid cartilage,                                                                                         | Into the side of the other,                                                    | To shut the rima glottidis.                                                              |

*MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE TONGUE ARE TWO IN NUMBER.*

| NAME.          | ORIGIN.                                                                                                      | INSERTION.                                                                                              | USE.                                                                                                                                                              |
|----------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Genio-Glossus. | From a rough point on the inside of the middle of the chin, its fibres running forward, upward and backward, | Into the tip, middle and root of the tongue slightly also in- to the base of the os hyoides, laterally. | To draw the tip of the tongue back, its middle down or to make its dorsum concave; to draw also the os hyoides forward and to thrust the tongue out of the mouth. |
| Anteriorly     |                                                                                                              |                                                                                                         |                                                                                                                                                                   |
| Laterally      | From the styloid process and the lateral ligament of the jaw,                                                | Into the root and sides of the tongue.                                                                  | To pull the tongue to a side and backward.                                                                                                                        |
| Stylo-Glossus. |                                                                                                              |                                                                                                         |                                                                                                                                                                   |

*MUSCLE ARISING FROM THE LARYNX AND INSERTED INTO THE TONGUE.*

| NAME.                    | ORIGIN.                                              | INSERTION.                   | USE.                                    |
|--------------------------|------------------------------------------------------|------------------------------|-----------------------------------------|
| Hyo-Glossus.             | From the base, cornu and appendix of the os hyoides, | Into the side of the tongue. | To pull the tongue inward and downward. |
| Inferiorly and laterally |                                                      |                              |                                         |

| SITUATION.                     | NAME.      | ORIGIN.                                                                                     | INSERTION.                  | USE.                              |
|--------------------------------|------------|---------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------|
| Internally<br>and<br>Laterally | Lingualis. | From the side of the root of the tongue, running forward between the hyo and genio-glossus, | Into the tip of the tongue. | To contract the tongue in length. |

*MUSCLES ARISING FROM THE CRANIUM AND INSERTED INTO THE PALATE  
ARE TWO IN NUMBER.*

| SITUATION.                       | NAME.                                | ORIGIN.                                                                                                                                                                                                                                 | INSERTION.                                                                                                                                                             | USE.                                                    |
|----------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Superiorly<br>and<br>Posteriorly | Circumflexus<br>or<br>Tensor Palati. | From the styloid process of the sphenoid bone and from the osseous part of the Eustachian tube, running down along the pterygoid internus, it passes over the hook of the internal pterygoid process and spreads into a broad membrane. | Into the velum pendulum palati and the semilunar edge of the palate bone; its posterior fibres sometimes join the constrictor pharygis superior and palato-pharyngeus. | To draw the velum downward and to stretch it laterally. |

## THE SAME CLASS CONTINUED.

| SITUATION.                       | NAME.           | ORIGIN.                                                                                                             | INSERTION.                                          | USE.                                                                                       |
|----------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------|
| Superiorly<br>and<br>Posteriorly | Levator Palati. | From the extremity of the petrous portion of the temporal bone and from the membranous part of the Eustachian tube, | Into the velum pendulum palati as far as the uvula. | To draw the velum upward and backward and so shut the passage from the fauces to the nose. |

*MUSCLES ARISING FROM THE LARYNX AND INSERTED INTO THE EPIGLOTTIS ARE THREE IN NUMBER.*

| SITUATION.                 | NAME.                             | ORIGIN.                                                                                                     | INSERTION.                                      | USE.                                           |
|----------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------|
| Laterally                  | Thyro-<br>Epiglottideus<br>Major. | By a few fibres from the thyroid cartilage,                                                                 | Into the epiglottis laterally.                  | To draw downward and to expand the epiglottis. |
| Laterally                  | Thyro-<br>Epiglottideus<br>Minor. | Just above the former.                                                                                      | Into the side of the epiglottis above its root. | To assist the former.                          |
| Laterally &<br>Posteriorly | Arytano-<br>Epiglottideus.        | From the lateral and upper part of the arytenoid cartilage, it runs along the outside of the external rima, | Into the epiglottis along with the former.      | To pull the epiglottis upon the rima.          |

## MUSCLE ARISING FROM THE CRANIUM AND INSERTED INTO THE UVULA.

| SITUATION. | NAME.         | ORIGIN.                                                                                | INSERTION.                 | USE.                  |
|------------|---------------|----------------------------------------------------------------------------------------|----------------------------|-----------------------|
| Superiorly | Azygos Uvulæ. | From the extremity of the suture of the palate bones it runs down the velum and uvula, | Into the tip of the uvula. | To elevate the uvula. |

## MUSCLE ARISING FROM THE TONGUE AND INSERTED INTO THE FAUCES.

| SITUATION.               | NAME.                       | ORIGIN.                                                                                                   | INSERTION.                                                                                                                           | USE.                                                                                                                                                         |
|--------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laterally and Inferiorly | Constrictor Isthmi Faucium. | From the side of the tongue near its root, it runs upward, within the anterior arch, before the amygdala. | Anteriorly, into the middle of the velum, at the root of the uvula being there connected with its fellow and with palato-pharyngeus. | To pull the velum and the root of the tongue toward each other, so contracting the passage between the two arches, and shutting the opening into the fauces, |

| SITUATION. | NAME.                           | ORIGIN.                                                                                                                                                                                                                                                                                       | INSERTION.                                                                                                     | USE.                                                                         |
|------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Laterally  | Stylo-Pharyngeus.               | From the root of the styloid process,                                                                                                                                                                                                                                                         | Into the side of the pharynx and back of the thyroid cartilage.                                                | To dilate and to elevate the pharynx and thyroid cartilage.                  |
| Superiorly | Constrictor Pharyngis Superior. | From the cuneiform process of the os occipitis, near the anterior condyloid foramina; from the pterygoid process of the sphenoid bone; from the upper and under jaw near the dentes sapientiae; being connected at this point with the buccinator and with fibres from the tongue and palate. | Into a white line in the middle of the posterior part of the pharynx, being covered by the constrictor medius. | To compress the upper part of the pharynx and to draw it upward and forward. |

## PHARYNX ARE TWO IN NUMBER.

| SITUATION.                            | NAME.                                | ORIGIN.                                                                                                                                                                                                                     | INSERTION.                                                                                                                                                                         | USE.                                                                             |
|---------------------------------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Superiorly<br>and<br>Surround-<br>ing | Constrictor<br>Pharyngis<br>Medius.  | From the appendix and cor-<br>nu of the os hyoides, and from<br>the ligament connecting it to<br>the thyroid cartilage,                                                                                                     | Into the white line on<br>the back of the pharynx<br>its upper fibres being con-<br>nected to the cuneiform<br>process of the occipital<br>bone.                                   | To compress<br>the pharynx,<br>and to draw it<br>and the os hy-<br>oides upward. |
| Surround-<br>ing                      | Constrictor<br>Pharyngis<br>Interior | Laterally from the thyroid<br>cartilage, near the attachment<br>of the sterno and therco-hyoi-<br>dei; also from the cricoid car-<br>tilage near the crico-thyroide-<br>us: being the largest of the<br>three constrictors. | Into the white line on<br>the back of the pharynx,<br>its superior fibres covering<br>half the constrictor medius<br>and its inferior the com-<br>mencement of the œsopha-<br>gus. | To compress<br>the pharynx<br>and to raise it<br>and the larynx<br>upward.       |



*MUSCLE ARISING FROM THE PALATE AND INSERTED INTO THE PHARYNX.*

| SITUATION.                     | NAME.                  | ORIGIN.                                                                                                                                                                                                                                                                   | INSERTION.                                                                                                        | USE.                                     |
|--------------------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Superiorly<br>and<br>Laterally | Palato-<br>Pharyngeus. | Posteriorly from the middle of the velum pendulum palati at the root of the uvula, and also from the tendinous expansion of the tensor palati. Passing behind the amygdala and within the posterior arch, its fibres run back to the sides and upper part of the pharynx. | Into the posterior and upper edge of the thyroid cartilage and between the inferior constrictors and the pharynx. | Powerfully<br>to contract the<br>fauces. |

### MUSCLES OF THE UPPER EXTREMITY.

#### MUSCLES ARISING FROM THE TRUNK AND INSERTED INTO THE SHOULDER ARE SIX IN NUMBER.

| SITUATION.  | NAME.              | ORIGIN.                                                                                                                                                                    | INSERTION.                                                                              | USE.                                                               |
|-------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Anteriorly  | Pectoralis Minor.  | Tendinous and fleshy from the upper edge of the third, fourth and fifth ribs near their cartilages.                                                                        | By a short tendon into the coracoides scapulæ.                                          | To pull the scapula forward and downward.                          |
| Superiorly  | Angularis Scapulæ. | From the transverse processes of the five superior vertebrae of the neck,                                                                                                  | Into the superior angle of the scapula.                                                 | To elevate the base of the scapula.                                |
| Posteriorly | Trapezius.         | From the spine and transverse ridge of the occiput, the ligamentum nuchæ, the spinous processes of the two inferior vertebrae of the neck, and from all those of the back, | Into the posterior half of the clavicle, the acromion and almost all the spina scapulæ. | To pull the scapula upward and backward, or backward, or downward. |

## THE SAME CLASS CONTINUED.

| SITUATION.                | NAME.            | ORIGIN.                                                                                                                        | INSERTION.                                                     | USE.                                   |
|---------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------|
| Posteriorly               | Rhomboideus      | From the spinous processes of the three inferior vertebræ of the neck, the ligamentum nuchæ and the five superior of the back, | Into all the base of the scapula.                              | To draw the scapula inward and upward. |
| Inferiorly and Anteriorly | Serratus Magnus. | From the nine superior ribs by as many digitations,                                                                            | Into all the inner edge of the base and angles of the scapula. | To pull the scapula forward            |
| Inferiorly                | Subclavius.      | From the cartilage of the first rib,                                                                                           | Into almost all the inferior side of the clavicle.             | To pull the clavicle downward.         |

| SITUATION.  | NAME.             | ORIGIN.                                                                                                                                                                                                                                                                                  | INSERTION.                                                                                | USE.                                                              |
|-------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Anteriorly  | Pectoralis Major. | From the cartilages of the fifth and sixth ribs, where its fibres mix with those of the obliquus externus abdominis, from almost all the length of the sternum, and from half the anterior edge of the clavicle.                                                                         | By two broad tendons which cross each other into the outer ridge of the bicipital groove. | To move the arm upward and inward.                                |
| Posteriorly | Latissimus Dorsi. | From the posterior part of the crista illii, from all the sacral and lumbar vertebral spines, from the seven inferior dorsal, and, by digitations, from the three or four inferior ribs passing over the inferior angle of the scapula, it turns before the teres major, and is inserted | Into the inner edge of the bicipital groove.                                              | To pull the arm backward and downward, and to rotate the humerus. |

# MUSCLES ARISING FROM THE SHOULDER AND INSERTED INTO THE HUMERUS ARE SEVEN IN NUMBER.

| SITUATION. | NAME.              | ORIGIN.                                                                                                                                  | INSERTION.                                                                               | USE.                                                                         |
|------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Anteriorly | Deltoides.         | From that portion of the clavicle which is unoccupied by the pectoralis major, from the acromion and inferior edge of the Spina scapulæ, | Into an extensive protuberance on the middle of the outside of the humerus.              | To pull the arm upward and forward, directly upward, or upward and backward. |
| Anteriorly | Coraco-Brachialis. | From the tip of the Processus Coracoïdes adhering to the short head of the biceps,                                                       | Into the middle of the internal part of the humerus.                                     | To raise the arm upward and forward.                                         |
| Superiorly | Supra-Spinatus.    | From all the supra spinal fossa of the scapula, passing under the acromion, it adheres to the capsular ligament of the shoulder.         | Into the superior depression of the protuberance on the outside of the bicipital groove. | To raise the arm and the capsular ligament.                                  |
| Externally | Infra-Spinatus:    | From all the infra spinal fossa scapulæ, adhering to the capsular ligament,                                                              | Into the middle depression of the same protuberance.                                     | To raise and to rotate the humerus outward.                                  |

| SITUATION. | NAME.          | ORIGIN.                                                                                  | INSERTION.                                                 | USE.                                                                   |
|------------|----------------|------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------|
| Externally | Teres Minor.   | From the costa inferior scapulae, adhering to the capsular ligament,                     | Into the inferior depression of the same protuberance.     | To draw the humerus backward, and to roll it outward.                  |
| Internally | Teres Major.   | From the outside of the inferior angle of the scapula adhering to the capsular ligament, | Into the inner edge of the bicipital groove.               | To draw the humerus backward, and to roll it inward.                   |
| Internally | Subscapularis. | From all the venter of the scapula, adhering to the capsular ligament,                   | Into the internal protuberance at the head of the humerus. | To rotate the humerus inward, and to bring it to the side of the body. |

MUSCLES ARISING FROM THE SHOULDER AND INSERTED INTO THE FORE-  
ARM ARE TWO IN NUMBER.

| SITUATION.  | NAME.                       | ORIGIN.                                                                                                                                                                                                                                                                                                                                                            | INSERTION.                                                          | USE.                                                               |
|-------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|
| Anteriorly  | Biceps<br>Cubiti.           | By two heads; one from the superior margin of the glenoid cavity, it passes through the capsular ligament of the shoulder, over the head of the humerus, and through the groove between the protuberances; the other, or short head, arises conjoined with coraco-brachialis, from the coracoïdes scapulae; both uniting at the middle of the humerus are inserted | Into the tubercle on the inner side of the upper end of the radius. | To supinate the hand, to bend the fore arm, and to extend the arm. |
| Posteriorly | Long Head<br>of<br>Triceps. | From inferior costa of scapula near its cervix,                                                                                                                                                                                                                                                                                                                    | Into the olecranon of the ulna.                                     | To extend the fore-arm and to bend the arm.                        |



| SITUATION.  | NAME.                           | ORIGIN.                                                                                                                                                             | INSERTION.                                                                 | USE.                                                           |
|-------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------|
| Posteriorly | Shorter Heads<br>of<br>Triceps. | The second head, from the back of the humerus near its upper end, and the third head from the back of the humerus lower down, and from the inter-muscular ligament, | Into the olecranon ulnæ.                                                   | To extend the fore-arm.                                        |
| Posteriorly | Anconeus.                       | From the posterior part of the external condyle of the humerus,                                                                                                     | Into a ridge on the outer and posterior part of the upper end of the ulna. | To extend the fore-arm.                                        |
| Anteriorly  | Brachius<br>Internus.           | From the middle of the os humeri, around the insertion of the deltoid and from the inter-muscular ligament, passing over the capsular ligament of the elbow joint,  | Into the coronoid process of the ulna.                                     | To bend the fore-arm and to pull upward the capsular ligament. |
| Externally  | Supinator<br>Radii<br>Longus.   | From the ridge above the external condyle of the os humeri, as far up as the middle of the bone,                                                                    | Into the outer side of the inferior end of the radius.                     | To bend the elbow joint and to supinate the hand.              |

## THE SAME CLASS CONTINUED.

| SITUATION.                | NAME.                         | ORIGIN.                                                                                                                      | INSERTION.                                                                                           | USE.                  |
|---------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------|
| Externally                | Supinator<br>Radii<br>Brevis. | From the external condyle of the os humeri, and from the external upper part of the ulna, adhering to the capsular ligament, | Into the neck and tubercle of the radius, and into the ridge running from that downward and outward. | To supinate the hand. |
| Internally and Anteriorly | Pronator<br>Radii<br>Teres.   | From the internal condyle of the humerus, and likewise from the coronoid process of the ulna,                                | Into the middle of the outside of the radius.                                                        | To pronate the hand.  |

*MUSCLES ARISING FROM THE HUMERUS AND INSERTED INTO THE HAND  
ARE SIX IN NUMBER*

| SITUATION.                | NAME.                       | ORIGIN.                                                                                                | INSERTION.                                                       | USE.                              |
|---------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------|
| Internally and Anteriorly | Flexor<br>Carpi<br>Ulnaris. | From the inner condyle of the humerus, the outer side of the olecranon and the fascia of the fore-arm, | Into the os pisiforme, and metacarpal bone of the little finger. | To bend the arm and wrist joints. |

| SITUATION.                 | NAME.                            | ORIGIN.                                                                                                                  | INSERTION.                                                                                                                 | USE.                                                                 |
|----------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Anteriorly                 | Palmaris Longus.                 | From the inner condyle of the humerus,                                                                                   | Into the carpal ligament, and aponeurosis palmaris.                                                                        | To bend the wrist and to stretch the aponeurosis.                    |
| Anteriorly and Externally. | Flexor Carpi Radialis.           | From the inner condyle of the humerus, and from the upper end of the ulna anteriorly, adhering to the capsular ligament. | Anteriorly, into the upper end of the metacarpal bone of the fore-finger, having passed through a groove of the trapezium. | To bend the wrist and elbow joints.                                  |
| Externally and Posteriorly | Extensor Carpi Radialis Longior. | From the lower part of the external ridge of the humerus above its external condyle.                                     | Posteriorly, into the upper end of the metacarpal bone of the fore-finger.                                                 | To extend the wrist joint, and occasionally to bend the elbow joint. |
| Externally and Posteriorly | Extensor Carpi Radialis Brevior. | From the external condyle of the humerus, and from the external lateral ligament of the elbow joint.                     | Posteriorly, into the upper part of the metacarpal bones of the fore and middle fingers.                                   | To extend the wrist joint.                                           |

| SITUATION.                 | NAME.                   | ORIGIN.                                                                                                                            | INSERTION.                                                                   | USE.                       |
|----------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------|
| Internally and Posteriorly | Extensor Carpi Ulnaris. | From the external condyle of the humerus, and from the middle of the ulna, through the groove at the extremity of which it passes. | Posteriorly, into the upper end of the metacarpal bone of the little finger. | To extend the wrist joint. |

MUSCLES ARISING FROM THE HUMERUS AND INSERTED INTO THE FINGERS ARE THREE IN NUMBER.

| SITUATION.                 | NAME.                                 | ORIGIN.                                                                                                                                                                                      | INSERTION.                                                                                                                                        | USE.                                                                                |
|----------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Anteriorly                 | Flexor Digitorum Sublimis Perforatus. | From the inner condyle of the humerus, the coronoid process of the ulna, the tubercle of the radius, and the middle of the fore-part of the radius, sending off four tendons, it is inserted | Anteriorly into the upper end of all the bones of the second phalanx, dividing near the ends of the first bones for the passage of the perforans. | To bend the second joint of the fingers, the first, the wrist, and the elbow joint. |
| Anteriorly and Internally. | Flexor Longus Pollicis.               | From the inner condyle of the humerus, and from the anterior side of the radius below its tubercle,                                                                                          | Into the last bone of the thumb.                                                                                                                  | To bend the last joint, and also the wrist joint.                                   |

| SITUATION.  | NAME.                              | ORIGIN.                                                                                                                                                                           | INSERTION.                                               | USE.                                                                     |
|-------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------|
| Posteriorly | Extensor<br>Digitorum<br>Communis. | From the external condyle of the humerus, adhering to the supinator brevis; it divides into four tendons, which are connected by small transverse ones upon the back of the hand. | Into the posterior part of all the bones of the fingers. | To extend all the joints of the fingers, the wrist, and the elbow joint. |

*An omission here, see the beginning*

MUSCLES ARISING FROM THE FORE-ARM AND INSERTED INTO THE FINGERS ARE FIVE IN NUMBER.

| SITUATION.  | NAME.                                    | ORIGIN.                                                                                                     | INSERTION.                                                | USE.                                                                 |
|-------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------|
| Posteriorly | Extensor Ossis<br>Metacarpi<br>Pollicis. | Posteriorly from the middle of the ulna, from the middle of the radius, and from the interosseous ligament, | Into the trapezium and metacarpal bone of the thumb.      | To extend the wrist joint, and the metacarpal bone of the thumb.     |
| Posteriorly | Extensor<br>Primi<br>Internodii.         | From the posterior part of the ulna and the interosseous ligament,                                          | Into the back of the first and second bones of the thumb. | To extend the wrist, the metacarpal and the first bone of the thumb. |

## THE SAME CLASS CONTINUED.

| SITUATION.  | NAME.                              | ORIGIN.                                                                                                                                                        | INSERTION.                                     | USE.                                                          |
|-------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------|
| Posteriorly | Extensor<br>Secundi<br>Internodii. | Posteriorly from the middle<br>of the ulna and from the in-<br>tersosseous ligament, its tendon<br>passing through a groove at<br>the lower end of the radius, | Into the last bone of the<br>thumb.            | To extend the<br>wrist and the<br>last joint of the<br>thumb. |
| Anteriorly  | Flexor<br>Longus.                  | This has already been de-<br>scribed.                                                                                                                          |                                                |                                                               |
| Posteriorly | Indicator.                         | Posteriorly from the middle of<br>the ulna,                                                                                                                    | Into the posterior part of<br>the fore-finger. | To extend the<br>fore-finger.                                 |

## MUSCLE ARISING FROM THE ULNA AND INSERTED INTO THE RADIUS.

| SITUATION. | NAME.                  | ORIGIN.                                       | INSERTION.                                         | USE.                    |
|------------|------------------------|-----------------------------------------------|----------------------------------------------------|-------------------------|
| Anteriorly | Pronator<br>Quadratus. | From the lower and inner part<br>of the ulna, | Into the lower and anterior<br>part of the radius. | To pronate the<br>hand. |

o. c. l. a. s. s. i. f. i. c. a. t. i. o. n. e. s.

## THREE IN NUMBER.

| SITUATION. | NAME.                            | ORIGIN.                                                                                         | INSERTION.                                                         | USE.                                  |
|------------|----------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------|
| Externally | Abductor Pollicis.               | From the annular ligament and os trapezium,                                                     | Into the outside of the root of the first bone.                    | To draw the thumb from the fingers.   |
| Anteriorly | Flexor Ossis Metacarpi Pollicis. | From the trapezium and annular ligament lying under the abductor,                               | Anteriorly into the lower end of the metacarpal bone of the thumb. | To draw the thumb toward the finger.  |
| Internally | Flexor Brevis Pollicis.          | From the trapezoides, magnum and unciniforme of the carpus, being divided by the flexor longus, | Into the ossa sesamoides and first bone of the thumb.              | To bend the first joint of the thumb. |

## MUSCLE ARISING FROM THE WRIST AND INSERTED INTO THE FORE-FINGER.

| SITUATION. | NAME.             | ORIGIN.                                                                      | INSERTION.                                                   | USE.                                      |
|------------|-------------------|------------------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------|
| Externally | Abductor Indicis. | From the trapezium, and from the inside of the metacarpal bone of the thumb, | Into the outer and back part of the first bone of the index. | To approximate the thumb and fore-finger. |



*MUSCLES ARISING FROM THE WRIST AND INSERTED INTO THE LITTLE  
FINGER ARE THREE IN NUMBER.*

| SITUATION. | NAME.                             | ORIGIN.                                                              | INSERTION.                                                                          | USE.                                                        |
|------------|-----------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Externally | Abductor Minimi Digiti Manus.     | From the os pisiforme and annular ligament,                          | Into the outer side of the upper end of the first bone of the little finger.        | To draw this finger from the rest.                          |
| Internally | Adductor Metacarpi Minimi Digiti. | From the process of the os unciforme, and from the annular ligament, | Into the inside and anterior part of the metacarpal bone of the fore finger.        | To draw the metacarpal bone of this finger toward the rest. |
| Anteriorly | Flexor Parvus Minimi Digiti.      | From the outside of the os unciforme and annular ligament,           | Into the inner and anterior part of the upper end of the first bone of this finger. | To bend the first joint, and to assist the adductor.        |

*THUMB.*

| SITUATION. | NAME.                 | ORIGIN.                                                          | INSERTION.                                         | USE.                                  |
|------------|-----------------------|------------------------------------------------------------------|----------------------------------------------------|---------------------------------------|
| Internally | Adductor.<br>Pollicis | From all the length of the metacarpal bone of the middle finger, | Into the inner part of the root of the first bone. | To draw the thumb toward the fingers. |

*MUSCLES ARISING FROM THE METACARPUS AND INSERTED INTO THE FINGERS ARE SEVEN IN NUMBER.*

| SITUATION. | NAME.              | ORIGIN.                                                                 | INSERTION.                                      | USE.                                                                       |
|------------|--------------------|-------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------|
| Anteriorly | Prior Indicis.     | From the upper anterior part of the metacarpal bone of the fore finger, | Into all the posterior part of the fore finger. | To abduct the fore finger, to bend the first joint and to extend the rest. |
| Internally | Posterior Indicis. | From the root and inner part of the metacarpal bone of the fore finger, | Into all the posterior part of the fore finger. | To abduct the fore finger, to bend the first joint and to extend the rest. |

| SITUATION. | NAME.            | ORIGIN.                                                                          | INSERTION.                                        | USE.                                                                                           |
|------------|------------------|----------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------|
| Externally | Prior Medii.     | From the roots of the metacarpal bones of the fore and middle fingers.           | Into all the posterior part of the middle finger. | To draw the middle finger toward the thumb, to bend its first, and to extend its other joints. |
| Internally | Posterior Medii. | From the roots of the metacarpal bones that sustain the middle and ring fingers, | Into all the posterior part of the middle finger. | To draw the middle finger outward, to bend its first, and to extend its other joints.          |
| Anteriorly | Prior Annularis. | From the anterior part of the root of the metacarpal bone of the ring finger,    | Into all the posterior part of the ring finger.   | To abduct the ring finger, to bend its first, and to extend its other joints.                  |

| SITUATION. | NAME.                     | ORIGIN.                                                                         | INSERTION.                                        | USE.                                                                            |
|------------|---------------------------|---------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------|
| Internally | Posterior Annularis.      | From the roots of the metacarpal bones of the ring and little fingers,          | Into all the posterior part of the ring finger.   | To abduct the ring finger, to bend its first, and to extend its other joints.   |
| Anteriorly | Interosseous Auricularis. | From the anterior part of the root of the metacarpal bone of the little finger, | Into all the posterior part of the little finger. | To abduct the little finger, to bend its first, and to extend its other joints. |

## MUSCLES OF THE LOWER EXTREMITY.

### MUSCLE ARISING FROM THE TRUNK AND INSERTED INTO THE FEMUR.

| SITUATION. | NAME.         | ORIGIN.                                                                                                                                 | INSERTION.                                                    | USE.                                                       |
|------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------|
| Anteriorly | Psoas Magnus. | From the side of the body and transverse process of the last vertebra of the back, and from the same parts of all the lumbar vertebrae, | Into the trochanter minor of the femur and some way below it. | To bend the thigh or the lumbar vertebrae upon the pelvis. |

### MUSCLES ARISING FROM THE PELVIS AND INSERTED INTO THE FEMUR ARE FOURTEEN IN NUMBER.

| SITUATION.  | NAME.            | ORIGIN.                                                                                                                                                                                                                                                                               | INSERTION.                                         | USE.                 |
|-------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------|
| Posteriorly | Gluteus Maximus. | From the posterior part of the crista ilii, from the side of the sacrum below its junction with the ilium, from the posterior sacro-ischiatic ligament and from the os coccygis. It passes over the posterior part of the trochanter major, and connected to the fascia of the thigh. | Into the upper and outer part of the linea aspera. | To extend the thigh. |

| SITUATION.  | NAME.            | ORIGIN.                                                                                                                                                           | INSERTION.                                                             | USE.                                                                         |
|-------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Posteriorly | Gluteus Medius.  | From the anterior superior spinous process of the ilium, anteriorly from the outer edge of the spine of the ilium, and posteriorly from the dorsum of that bone,  | Into the middle great depression of the trochanter major.              | To pull the femur outward and backward, and when bent, to rotate it outward. |
| Posteriorly | Gluteus Minimus. | From a ridge extending from below the superior anterior spinous process of the ilium to its great notch,                                                          | Into the anterior great depression of the trochanter major.            | To pull the femur outward and backward and to rotate it outward.             |
| Posteriorly | Pyriformis.      | Internally from the second, third, and fourth false vertebrae, passing out of the pelvis, it receives some fibres from the posterior inferior spine of the ilium. | Into the anterior small depression on the top of the trochanter major. | To aid in moving the thigh upward and rolling it outward.                    |

## THE SAME CLASS CONTINUED.

| SITUATION.                       | NAME.                  | ORIGIN.                                                                                                                                                                                                                                                      | INSERTION.                                                                                      | USE.                                                                 |
|----------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Internally<br>and<br>Posteriorly | Obturator<br>Internus. | From almost all the internal circumference of the obturator foramen, it passes out of the pelvis between the tuber ischii and the posterior sacro-ischiatic ligament, passing also over the capsular ligament of the hip joint it is sheathed by the gemini. | Into the posterior small depression on the top of the trochanter major.                         | To roll the femur obliquely outward.                                 |
| Posteriorly                      | Gemini.                | The superior from the spine, and the inferior from the tuberosity of the ischium. In their course they form a sheath for the obturator internus.                                                                                                             | Into the posterior part of the top of the trochanter major on each side the obturator internus. | To roll the thigh outward and to retain the tendon of the obturator. |
| Posteriorly                      | Quadratus<br>Femoris.  | From the outer edge of the tuber ischii,                                                                                                                                                                                                                     | Posteriorly into a ridge between the great and small trochanter.                                | To roll the thigh outward.                                           |
| Anteriorly                       | Iliacus<br>Internus.   | From all the venter of the ilium and also from the transverse process of the last lumbar vertebra,                                                                                                                                                           | Into the trochanter minor.                                                                      | To bend the thigh.                                                   |



| SITUATION.                      | NAME.                    | ORIGIN.                                                                                                                                            | INSERTION.                                                                      | USE.                                                                               |
|---------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Anteriorly<br>and<br>Internally | Pectinal's.              | From the upper and anterior part of the os pubis,                                                                                                  | Into the anterior upper part of the linea aspera.                               | To bring the thigh upward and inward, to rotate it in some degree outward.         |
| Internally                      | Obturator Externus.      | From the inferior anterior part of the pubis, from the forepart of the crus of the ischium, and from the external margin of the obturator foramen, | Into the cavity behind the trochanter major, adhering to the capsular ligament. | To roll the femur outward and to prevent the capsular ligament from being pinched. |
| Internally                      | Adductor Longus Femoris. | From the superior anterior part of the os pubis and from its symphysis, internally to the pectinalis.                                              | Near the middle of the linea aspera.                                            | To pull the femur inward and upward and, in some degree, to rotate it outward.     |
| Internally                      | Adductor Brevis Femoris. | From the pubis near its symphysis below and behind the former,                                                                                     | Into the upper part of the linea aspera above the insertion of the former.      | Its use is similar.                                                                |

## THE SAME CLASS CONTINUED.

| SITUATION. | NAME.                      | ORIGIN.                                                                        | INSERTION.                                                                                                                            | USE.                           |
|------------|----------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Internally | Adductor Magnus - Femoris. | Near the symphysis more inferiorly than the former, and from the tuber ischii, | Into almost all the length of the linea aspera, into the ridge leading from that to the internal condyle and into the condyle itself. | Similar to that of the others. |

## MUSCLE ARISING FROM THE PELVIS AND INSERTED INTO THE FASCIA OF THE THIGH.

| SITUATION  | NAME.                   | ORIGIN.                                                             | INSERTION.                                                                      | USE.                                                              |
|------------|-------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Externally | Tensor Vaginae Femoris. | Externally from the anterior superior spinous process of the ilium, | A little below the trochanter major into the inside of the fascia of the thigh. | To stretch the fascia, to abduct the thigh and rotate it outward. |

| SITUATION.                | NAME.             | ORIGIN.                                                                             | INSERTION.                                                                   | USE.                                                                    |
|---------------------------|-------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Anteriorly                | Rectus Cruris.    | From the inferior anterior spine of the ilium and from the dorsum of the same bone, | Into the patella and subsequently into the anterior tuberosity of the tibia. | To bend the thigh and to extend the leg.                                |
| Anteriorly and internally | Sartorius.        | From the anterior superior spine of the ilium, passing inwardly it is inserted      | Into the inner anterior side of the upper end of the tibia.                  | To elevate the thigh and turn it outward, and to bend the leg inwardly. |
| Internally                | Gracilis.         | From the symphysis pubis,                                                           | Into the tibia behind the sartorius.                                         | To adduct the femur and to bend the knee.                               |
| Posteriorly               | Semitendinosus.   | Conjoined with the long head of the biceps from the upper part of the tuber ischii, | Into the tibia behind the sartorius.                                         | To extend the thigh and bend the leg.                                   |
| Posteriorly               | Semi-membranosus. | From the upper part of the tuber ischii,                                            | Into the inner and back part of the head of the tibia.                       | To extend the thigh and to bend the leg.                                |

## THE SAME CLASS CONTINUED.

| SITUATION.  | NAME.                      | ORIGIN.                                                                      | INSERTION.                              | USE.                                  |
|-------------|----------------------------|------------------------------------------------------------------------------|-----------------------------------------|---------------------------------------|
| Posteriorly | Long Head<br>of<br>Biceps. | Conjointly with the semitendinosus, from the upper part of the tuber ischii, | Into the top of the head of the fibula. | To extend the thigh and bend the leg. |

*MUSCLES ARISING FROM THE FEMUR AND INSERTED INTO THE LEG ARE  
FIVE IN NUMBER.*

| SITUATION. | NAME.               | ORIGIN.                                                                                                        | INSERTION.                                                                  | USE.               |
|------------|---------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|--------------------|
| Anteriorly | Cruralis.           | From between the two trochanters of the femur, being connected to the femur downward and to both vasti.        | Into the upper part of the patella and so into the tuberosity of the tibia. | To extend the leg. |
| Anteriorly | Vastus<br>Externus. | From the root of the trochanter major and whole length of the linea aspera.                                    | Similar but more externally.                                                | To extend the leg. |
| Anteriorly | Vastus<br>Internus. | From between the root of trochanter minor and anterior part of femur, and from all the length of linea aspera. | Similar but internally, both send an aponeurosis down the leg.              | To extend the leg. |

| SITUATION.  | NAME.                       | ORIGIN.                                                                                                   | INSERTION.                                            | USE.                                                             |
|-------------|-----------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------|
| Posteriorly | Short Head<br>of<br>Biceps. | From the linea aspera below the insertion of the gluteus maximus,                                         | Into the top of the head of the fibula.               | To bend the leg.                                                 |
| Posteriorly | Popliteus.                  | From the inferior posterior part of the external condyle of the femur, adhering to the capsular ligament, | Into a ridge at the upper internal part of the tibia. | To bend the leg and prevent the capsular ligament being pinched. |

*MUSCLES ARISING FROM THE FEMUR AND INSERTED INTO THE FOOT  
ARE TWO IN NUMBER.*

| SITUATION.  | NAME.          | ORIGIN.                                                                                                                                | INSERTION.                     | USE.                                    |
|-------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------|
| Posteriorly | Gastrocnemius. | By two heads, one from the superior posterior part of the internal condyle of the femur, the other from the same part of the external. | Into the tendon of the Soleus. | To bend the knee and to aid the Soleus. |

## THE SAME CLASS CONTINUED.

| SITUATION.  | NAME.      | ORIGIN.                                                                                                                                            | INSERTION.                                                                       | USE.                                                                                                       |
|-------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Posteriorly | Plantaris. | From the upper and back part of the root of the external condyle of the femur, adhering to the capsular ligament of the knee joint in its descent, | Into the inside of the posterior part of the os calcis below the Tendo-Achillis. | To aid in bending the knee, and in extending the foot, and to prevent the capsular ligament being pinched. |

MUSCLES ARISING FROM THE LEG AND INSERTED INTO THE FOOT ARE  
SIX IN NUMBER.

| SITUATION.  | NAME.   | ORIGIN.                                                                                                                                                                                                 | INSERTION.                                                                     | USE.                |
|-------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------|
| Posteriorly | Soleus. | From the posterior part of the head of the fibula, from that bone some way downward, and also from the posterior and middle part of the upper end, of the tibia and from the same bone more internally, | By its tendon (named tendo Achillis) into the posterior part of the os calcis. | To extend the foot. |

| SITUATION.  | NAME.                 | ORIGIN.                                                                                                                                                                                                                                                                            | INSERTION.                                                                                                | USE.                                            |
|-------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Posteriorly | Tibialis<br>Posticus. | From the anterior upper part of the tibia, and, passing through the interosseous ligament, from the back of the fibula, from a great portion of the back of the tibia superiorly and from the interosseous ligament, its tendon passing in a groove behind the malleolus internus, | Into the upper and inner part of the os naviculare, thence into the cuneiforme internum and medium.       | To extend the foot and to turn the toes inward. |
| Externally  | Peroneus<br>Longus.   | Anteriorly from the head and externally from the body of the fibula almost as far down as the ankle, its tendon passing through a groove in the posterior part of the lower end of the fibula, on the outside of the os calcis and on the inferior part of the os cuboides.        | Into the os cuneiforme internum and into the outside of the root of the metatarsal bone of the great toe. | To extend and to move the foot outward.         |
| Externally  | Peroneus<br>Brevis.   | From above the middle of the external part of the fibula,                                                                                                                                                                                                                          | Externally into the root of the metatarsal bone of the little toe.                                        | To assist the former.                           |



## THE SAME CLASS CONTINUED.

| SITUATION. | NAME.                                       | ORIGIN.                                                                                                                                                                                        | INSERTION.                                                                                          | USE.                                       |
|------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------|
| Anteriorly | Tibialis<br>Anticus.                        | From the outside of the anterior tuberosity of the tibia, from the outside of the bone itself and from the interosseous ligament, its tendon passing under the annular ligament of the tarsus. | Into the inner part of the os cuneiforme internum and root of the metatarsal bone of the great toe. | To bend the foot and turn the toes inward. |
| Anteriorly | Peroneus<br>Tertius<br>or<br>Nonus Vesalii. | From the middle of the fibula almost to its inferior extremity,                                                                                                                                | Into the root of the metatarsal bone of the little toe.                                             | To assist in bending the foot.             |

| SITUATION. | NAME.                                      | ORIGIN.                                                                                                                                                                                                                                          | INSERTION.                                                        | USE.                                                                                                        |
|------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Anteriorly | Extensor<br>Longus<br>Digitorum<br>Pedis.  | From the anterior inner part<br>of the head of the fibula, from<br>the anterior outer part of the<br>head of the tibia, from the in-<br>terosseous ligament and from<br>the fascia of the leg, also from<br>the anterior spine of the<br>fibula, | Into all the phalanges of<br>the four lesser toes.                | To bend the<br>anicle joint and<br>to extend all the<br>joints of the toes<br>into which it is<br>inserted. |
| Anteriorly | Extensor<br>Proprius<br>Pollicis<br>Pedis. | From the anterior part of<br>the fibula some way below its<br>head to nearly its lower ex-<br>tremity,                                                                                                                                           | Into the posterior part<br>of both the bones of the<br>great toe. | To bend the<br>anicle joint and<br>to extend the<br>great toe.                                              |

| SITUATION.  | NAME.                                                             | ORIGIN.                                                                                                                                                                                                                                                                                                                                                    | INSERTION.                                                    | USE.                                                                     |
|-------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------|
| Posteriorly | Flexor<br>Longus<br>Digitorum<br>Pedis<br>Profundus<br>Perforans. | From the oblique ridge on the upper back part of the tibia and from the inner and outer edges of this bone, enclosing the tibialis posticus by its fibres, and afterwards passing through a groove of the os calcis, it divides into four tendons which run through those of the perforatus. It receives a slip of tendon from the flexor pollicis longus. | Into the extremity of the last joint of the four lesser toes. | To extend the ankle joint, to turn the foot inward and to bend the toes. |
| Posteriorly | Flexor<br>Longus<br>Pollicis<br>Pedis.                            | Posteriorly from below the head of the fibula, being continued almost to its inferior extremity,                                                                                                                                                                                                                                                           | Into the posterior part of both the bones of the great toe.   | To extend the ankle joint and to bend the great toe.                     |

INTO THE TOES IN GENERAL ARE IN NUMBER THREE.

| SITUATION. | NAME.                                                                       | ORIGIN.                                                                                                                                   | INSERTION.                                                                                                                 | USE.                                                        |
|------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Superiorly | Extensor<br>Brevis<br>Digitorum<br>Pedis.                                   | From the anterior and upper<br>part of the calcaneum lying<br>under the tendons of the ex-<br>tensor longus.                              | Inserted into the poste-<br>rior part of all the toes<br>except the little one.                                            | To extend the<br>toes.                                      |
| Inferiorly | Flexor<br>Brevis<br>Digitorum<br>Pedis.                                     | Between the abductors of<br>the great and little toes, from<br>protuberances upon the infe-<br>rior posterior part of the cal-<br>caneum. | By four tendons into the<br>second phalanx of the four<br>lesser toes: that of the<br>little toes is sometimes<br>wanting. | To bend the<br>first and second<br>joints of these<br>toes. |
| Inferiorly | Flexor<br>Digitorum<br>Accessorius,<br>or<br>Massa Carnea<br>Jacobi Sylvii. | From the external tuberosity<br>of the calcaneum and from a<br>great part of its internal con-<br>cavity.                                 | Inserted by means of the<br>tendons of the flexor lon-<br>gus which it joins at its<br>division.                           | To assist the<br>flexor longus.                             |

*MUSCLES ARISING FROM THE TENDONS OF THE FLEXOR LONGUS AND  
INSERTED INTO THE TOES ARE FOUR IN NUMBER.*

| SITUATION. | NAME.                 | ORIGIN.                                                                                                                                          | INSERTION.                                                                       | USE.                                                                                     |
|------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Inferiorly | Lumbricales<br>Pedis. | By four commencements<br>from the tendon of the flexor<br>profundus, near the insertion<br>of the massa carnea, and just<br>before its division. | By four tendons, into the<br>internal posterior part of<br>the four lesser toes. | To draw the<br>toes inward, to<br>bend their first<br>joint and to ex-<br>tend the rest. |

*MUSCLES ARISING FROM THE TARSUS AND METATARSUS AND INSERTED  
INTO THE TOES ARE TWELVE IN NUMBER.*

| SITUATION.                       | NAME.                           | ORIGIN.                                                                                                                                                                                | INSERTION.                                                                                    | USE.                        |
|----------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------|
| Inferiorly,<br>and<br>Externally | Adductor<br>Pollicis.<br>Pedis. | From the inner protuberance<br>of the calcaneum, and from the<br>same bone where it joins the<br>naviculare,                                                                           | Into the os sesamoi-<br>deum internum, and the<br>base of the first bone of the<br>great toe. | To adduct the<br>great toe. |
| Inferiorly                       | Flexor Brevis<br>Pollicis.      | From the inferior anterior<br>part of the calcaneum, where it<br>joins the cuboides, and from<br>the cuneiforme externum. In-<br>ternally connected with the<br>abductor and adductor. | Into the os sesamoi-<br>deum externum and base<br>of the first bone of the<br>great toe.      | To bend the<br>first joint. |

| SITUATION.                       | NAME.                                       | ORIGIN.                                                                                                                                                                                    | INSERTION.                                                                                         | USE.                                       |
|----------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------|
| Inferiorly<br>and<br>Internally  | Abductor Pol-<br>licis Pedis.               | From the calcaneum, cu-<br>boides, cuneiforme externum,<br>and the base of the metatarsal<br>bone of the second toe,                                                                       | Into the os sesamoi-<br>deum externum, and the<br>base of the metatarsal bone<br>of the great toe. | To abduct the<br>great toe.                |
| Inferiorly<br>and<br>Internally  | Adductor<br>Minimi Digiti<br>Pedis.         | From the inside of the root<br>of the metatarsal bone of the<br>little toe,                                                                                                                | Into the inside of the<br>base of the first bone of the<br>little toe.                             | To adduct the<br>little toe.               |
| Inferiorly                       | Flexor Brevis<br>Minimi<br>Digiti<br>Pedis. | From the cuboides near the<br>groove of the peroneus longus,<br>and from the outside of its<br>own metatarsal bone,                                                                        | Into the top of the me-<br>tatarsal bone and base of<br>the first bone of the little<br>toe.       | To bend the<br>first joint of this<br>toe. |
| Inferiorly<br>and<br>Externally. | Abductor<br>Minimi<br>Digiti<br>Pedis.      | From before the external<br>protuberance of the calcaneum,<br>and from the root of the meta-<br>tarsal bone of the little toe,                                                             | Into the base of the first<br>bone of the little toe.                                              | To abduct the<br>little toe.               |
| Inferiorly                       | Adductor Indi-<br>cis Pedis.                | From the inside of the base<br>of the metatarsal bone of the<br>fore toe, from the outside of<br>the base of the metatarsal bone<br>of the great toe, and from the<br>cuneiforme internum, | Into the inside of the<br>base of the first bone of the<br>fore toe.                               | To adduct the<br>fore toe.                 |

## THE SAME CLASS CONTINUED.

| SITUATION. | NAME.                         | ORIGIN.                                                                            | INSERTION.                                                        | USE.                      |
|------------|-------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------|
| Inferiorly | Abductor Indicis Pedis.       | From the bases of the metatarsal bones of the fore and second toes,                | Into the outside of the base of the first bone of the fore toe.   | To abduct the fore toe.   |
| Inferiorly | Adductor Medii Digiti Pedis.  | From the inside of the base of the metatarsal bone of the middle toe,              | Into the inside of the base of the first bone of the middle toe.  | To adduct the middle toe. |
| Inferiorly | Abductor Medii Digiti Pedis.  | From the bases of the metatarsal bones of the second and third toes,               | Into the outside of the base of the first bone of the second toe. | To abduct the second toe. |
| Inferiorly | Adductor Tertii Digiti Pedis. | From the inner and under part of the base of the metatarsal bone of the third toe, | Into the inside of the base of the first bone of the third toe.   | To adduct the third toe.  |
| Inferiorly | Abductor Tertii Digiti Pedis. | From the roots of the metatarsal bones of the third and little toes,               | Into the outside of the base of the first bone of the third toe.  | To abduct the third toe.  |



MUSCLE ARISING FROM ONE BONE OF THE METATARSUS AND INSERTED  
INTO ANOTHER.

| SITUATION. | NAME.                   | ORIGIN.                                                                                                                  | INSERTION.                                                                                                                              | USE.                                          |
|------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Inferiorly | Transversalis<br>Pedis. | Inferiorly from the anterior<br>end of the metatarsal bone of<br>the great toe, and from the os<br>sesamoideum internum. | Inferiorly and externally,<br>into the anterior end of the<br>metatarsal bone of the little<br>toe and the ligament of<br>the next one. | To contract<br>the foot from<br>side to side. |

## OF MUSCULAR MOTION.

The smallest fibres of muscles when examined by the microscope are found to have an *undulated* appearance. This was thought by Prochaska to be owing to the impressions of Vessels and Nerves. But Dr. Monro, having described a similar appearance in Nerves and in Tendons, very properly considers them as *folds* or *joints* to permit flexion and extension.

All muscles have a constant tendency to contract, and the motions by which they effect these contractions are denominated *Voluntary, Involuntary, or Mixed*.

VOLUNTARY MOTIONS are such as are caused by a deliberate act of volition.

INVOLUNTARY MOTIONS are such as are altogether independent of the will, e. c. the Pulsation of the Heart, the Peristaltic motion of the intestines.

MIXED MOTIONS are such as depend upon the will, but generally require no deliberate or apparent act of volition, e. c. the motion of the Diaphragm.

The powers which cause these motions are denominated *Vis Mortua, Vis Insita* and *Vis Nervea*.

The VIS MORTUA is merely that elastic tendency to contract which muscular fibre possesses in common with other animal matter.

The VIS INSITA is also termed *Irritability*, and is properly the Capability of Contraction.

The VIS NERVEA is also termed *Sensibility*, and is properly the Cause of Contraction.

Many contests have arisen respecting the two last of these powers, which are not yet either properly understood or defined.

## . BURSALOGY.

The BURSÆ MUCOSÆ are mucous bags which secrete a fluid for the purpose of lubricating the Tendons of the Muscles.

They have lately been demonstrated not only in the Trunk but also in the Head and Extremities, wherever one tendon passes over another, a Bone, a Cartilage, or Ligament, and<sup>e</sup>ven between superficial Tendons and the Integuments.

## FASCIALOLOGY.

FASCIE are Tendinous or Aponeurotic expansions which serve to defend muscles and to bind them together.

The most important of these are

The TEMPORAL FASCIA which arises from the upper edge of the Zygoma, the posterior edge of the Os Malæ, and the Temporal process of the Os Frontis, and is inserted into the temporal ridge of that Bone and of the Os Parietale.

The FASCIA OF THE ARM which embraces and confines its muscles.

The FASCIA OF THE FORE ARM, in a great measure derived from the Tendon of the Biceps.

The PALMAR FASCIA, proceeding from the Palmaris Longus and the anterior annular Ligament.

The FASCIA OF THE THIGH principally derived from the Tensor Vaginæ Femoris and the Glutens Maximus.

The FASCIA OF THE LEG which embraces all its muscles, and

The PLANTAR FASCIA which proceeds from the Os Calcis and is expanded over the sole of the foot.

Of these *Fasciæ* the *Palmar* and the *Plantar* are by much the strongest. The *Femoral* is also very strong, especially externally, where indeed all the *Fasciæ* of the Extremities have their greatest strength.

## SPLANCHNOLOGY.

### MOUTH, FAUCES, SALIVAL GLANDS, AND ÆSOPHAGUS.

#### MOUTH.

This cavity is formed anteriorly by the *Lips*, laterally by the *Cheeks*, superiorly by the *Palate*, and inferiorly by the *Tongue* and its *Membranes*. The *Teeth* fixed in the alveolar processes, and surrounded by the *Gums*, form a couple of half Ellipses within its anterior and lateral parts.

The *Lips*, surrounding the anterior aperture of the mouth, are composed of common integuments and muscles, and their junction on each side is termed the *angles of the mouth*.

The *CHEEKS*, passing laterally from the upper to the lower jaw, and forming its sides, consist also of muscles and common integuments.

The *PALATE* is divided into two portions; the *HARD PALATE*, which is anterior, being composed of the palatine plates of the superior maxillary and palate bones, covered by the membrane of the mouth, and the *SOFT PALATE*, placed behind the former, consisting of a pendulous duplicature of the membrane of the mouth, denominated the *VELUM PENDULUM PALATI*. From the middle of this, the *UVULA* hangs down, forming it into two *arches* on each side, one of which is thrown forward to the side of the tongue, the other backward to the pharynx. It is between these arches on each side that the amygdalæ are situated.

The TONGUE is entirely a muscular body, covered by common integuments, and consisting of a *Base*, a *Body*, and a *Back*; which last is covered by villous *Papillæ*, and its inferior surface is tied by a *Frænum* to the inside of the symphysis of the jaw.

The MEMBRANE OF THE MOUTH is a reflection or continuation of the Cutis and Cuticle.

The TEETH have already been described.

The GUMS are a red, firm, and spongy substance passing from the Alveolar processes around the necks of the Teeth.

### FAUCES.

This cavity is situated between the Mouth and the Pharynx into which it opens. The Eustachian Tubes terminate in it on each side, and the Nares open into it above the Velum Pendulum Palati. The membrane of the Mouth and Nares is also continued over this cavity.

### SALIVAL GLANDS.

These secrete the saliva, and are called, from their different situations, *Parotid*, *Maxillary*, *Sublingual*, *Thyroid*, *Molar*, *Buccal*, *Labial*, *Lingual*, *Amygdalæ*, *Palatine*, *Uvular*, *Arytenoid*, &c.

The PAROTID GLANDS are very large, situated on each side the head, between the Ramus of the Jaw and the Meatus Auditorius Externus, extending above to the Zygoma and below to the Mastoid process. The *Parotid Duct* proceeds from its anterior upper part, and, passing forward over the masseter, perforates the Buccinator opposite the second and third molar teeth.

The MAXILLARY GLAND, less than the Parotid, is situated at the inside of the angle of the Jaw. Its *Duct* proceeds to the

le of the Frænum of the tongue, between the Genio-Glossus and the Sublingual Glands.

The SUBLINGUAL GLANDS, still less than the maxillary, are situated under the anterior part of the sides of the Tongue, on the Mylo-Hyoidei. Their *Ducts* terminate with the maxillary ducts.

The THYROID GLAND is placed upon the anterior part of the larynx. No excretory duct has been discovered to it.

The MOLAR GLANDS are situated between the Masseter and pectorator.

The BUCCAL GLANDS cover the insides of the Cheeks.

The LABIAL GLANDS are on the insides of the Lips.

The LINGUAL are in the membrane of the Tongue.

The PALATINE in the septum and arch of the Palate.

The AMYGDALÆ are situated between the two lateral half arches of the palate. Being perforated with numerous foramina, they considerably resemble the external appearance of an almond shell. These lead to an irregular cavity within the gland.

The UVULAR GLANDS are placed in the Uvula, and

The ARYTENOID are situated upon the fore part of the ary-epiglottoid Cartilages.

## PHARYNX.

This cavity, as well as the Larynx, was particularly described in the Myological part of the work, previous to the description of its muscles.



## ŒSOPHAGUS.

The Œsophagus or Gullet is a canal, partly membranous and partly muscular, which passes behind the Trachea and before the Cervical Vertebrae to the upper orifice of the stomach. It is situated between the layers of the posterior mediastinum and somewhat toward the left side. It is composed of three tunics or coats, resembling those of the stomach and intestines, viz. a common tunic which is external, a muscular one in the middle, and a villous one, which is internal. By this tube the food passes into the stomach, situated in the abdomen, which we now proceed to describe.

## SPLANCHNOLOGY.

### ABDOMINAL VISCERA.

#### ABDOMEN.

This is a cavity situated between those of the Thorax and Pelvis.

#### ITS REGIONS.

It is divided into several regions, viz. the *EPIGASTRIC*, which includes the stomach, the *HYPOCHONDRIAC*, which are situated each side the former, the *UMBILICAL*, situated around the Umbilicus, the *EPICHOLIC*, on each side the Umbilical, the *POGASTRIC*, including the bladder, and the *INGUINAL*, comprehending the groins.

#### ITS CONTENTS.

These are the *Peritoneum* and its *productions*, the *Stomach*, the *Small and Large Intestines*, the *Liver* and *Gall-bladder*, the *Spleen* and the *Pancreas*.

Part of the *Aorta* and *Vena Cava*, numerous arteries, veins and lacteals are contained in the Abdomen, as well as the *Kidneys* and *Renal Capsules*, which last, however, placed behind the *Peritoneum*, will be more properly described with the *Genital Viscera*.

#### PERITONEUM.

This membrane lines all the cavity of the Abdomen, and more or less completely invests all its Viscera. Its internal

surface is very smooth, and is continually moistened by a fluid exhaling from its surface. Its external surface, by which it is attached to the parietes of the Abdomen, or to the surfaces of Viscera, is more rough, and adheres to them by the Cellular Membrane.

#### ITS DUPLICATIONS.

These are productions of the Peritoneum, consisting of two layers such as the GREAT and SMALL OMENTUM, the first of which is attached to the great curvature of the stomach, while the second occupies the space between its small curvature and the liver, and the MESENTERY which supports the intestines and conducts their vessels. Other *Productions* of the Peritoneum, not properly termed duplicatures, accompany the vessels in the groin, or the spermatic cords through the ring, or partially invest some viscera.

#### COATS OR TUNICS OF THE INTESTINES.

These are four in number, viz. a COMMON COAT, which is membranous, and derived from the Peritoneum; a MUSCULAR COAT, which consists of two planes or layers of muscular fibres; a NERVOUS OR SPONGY COAT, composed of cellular membrane, nerves and vessels, and a VILLOUS COAT, which somewhat resembles, in its internal surface, the Pile of Velvet, and which lines the former.

#### STOMACH.

This is the great receptacle of food composed of the Coats above enumerated.

Its SITUATION is partly in the Epigastric, and partly in the left Hypochondriac region.

Its FORM is incurvated superiorly when empty, and some-

that posteriorly when full, its upper or posterior part being denominated its LESSER CURVATURE, and its inferior or anterior its GREATER CURVATURE; the left or superior end being most capacious, is called its GREAT EXTREMITY, its right or more inferior end, being more contracted, is called its LESS EXTREMITY. The stomach has two openings, the first a continuation of the Œsophagus, placed superiorly between its great extremity and its lesser curvature, and denominated its CARDIAC ORIFICE; the other, situated at the end of its small extremity, lower than the former, and connecting it to the intestinal canal, named the PYLORUS.

The PYLORUS is a flat contractile ring or sphincter, formed by a duplicature of the two inner coats of the stomach, which passes inward between it and the intestines, so as nearly to divide the cavity of the one from that of the other.

Its CONNECTIONS are with the Œsophagus superiorly, the Duodenum inferiorly, the Omentum both above and below, and the Pancreas behind.

### THE SMALL INTESTINES.

These constitute one Canal continued from the Pylorus of the Stomach to the great Intestine. Although there is no marked distinction between its parts, it has nevertheless been divided into three portions, viz. the *Duodenum*, which is shortest, the *Jejunum*, which is longer, and the *Ileum*, which is longest.

#### DUODENUM.

Its LENGTH, commencing from the Pylorus, is about twelve fingers breadth.

INTERNAL STRUCTURE. Within this Intestine are a number of Semi-Annular folds produced by the Nervous and Villous

Tunies called *Valvule Conniventes*, of Glandular Lacunæ called *Glandulæ Brunneri*, and of follicles termed the AMPULLULÆ of LIEBERCUHEN.

Its course is first backward and downward, then bends towards the right Kidney, and thence gradually ascends to the left before the last Dorsal Vertebra; passing then a little forward, it terminates in the

#### JEJUNUM.

This, commencing from the Duodenum, forms nearly *two fifths* of the remainder of the intestine. Along the great curvature of this intestine a *Ligamentary Band*, about five lines in breadth, passes its *Valvule Conniventes* are very large and numerous, and its small Glandular Lacunæ are termed, from their being in bunches, *Plexus Glandulosi Peyeri*.

#### ILEUM.

This constitutes the remaining three fifths of the Intestine. The *Ligamentary Band* is continued upon it; but its *Valvule Conniventes* diminish, and its Glands are less prominent.

#### GREAT INTESTINES.

These also consist of three portions, viz. a short bag termed *Cœcum*, a long portion termed *Colon*, and a shorter one named the *Rectum*.

#### COECUM.

This bag is situated below the right Kidney upon the Iliacus internus. The Ileum opens into its right side, and the Colon from its upper part. From its bottom, which is turned downward, a small imperforate APPENDIX, denominated VERMIFORMIS, proceeds. Its internal surface is glandular, and over

its external surface *Three Great Ligamentous Bands* proceed, one of which is covered by the Mesentery, here termed *Mesocolon*, and the other two are situated on each side.

## COLON.

This is by much the most considerable of the Intestines.

Its DIVISIONS are into three portions, an *Ascending*, a *Transverse*, and a *Descending* portion.—Its ASCENDING PORTION commences under the right Kidney, passes under the Gall Bladder, by which it is tinged, and proceeds to the first turn of the Duodenum.—Its TRANSVERSE PORTION runs before or a little below the great convexity of the stomach, and passes beneath the spleen.—Its DESCENDING PORTION passes over the left Kidney, bends towards the vertebræ, and forms a double incurvation, termed its SIGMOID FLEXURE.

STRUCTURE. The *Strong Ligamentary Bands* are continued over this Intestine, and by, as it were, contracting its length, form it into strong *Valvulae Conniventes* and *Cavities*, denominated the CELLS OF THE COLON. It is properly where this and the last intestine join and the Ileum opens, that their edges project inward, and form the GREAT VALVE OF THE ILEUM, Coecum or Colon. Along the great arch and the two last turns of the Colon there are a number of fringes called *Appendices Epiploicae*.

## RECTUM.

This is the last portion of the great Intestine ; it passes in a straight course from the last Lumbar Vertebra, over the fore part of the Sacrum, to the tip of the Os Coccygis, where it terminates in the ANUS.

## THE LIVER.

The Liver or Gland which secretes the Bile, is a large, firm body, of a dark red colour.

**SITUATION.** It is placed under the arch of the diaphragm, partly in the Epigastric and partly in the right Hypochondriac region, which it nearly fills, and extends even into the left.

**ITS FORM.** The Liver is convex superiorly, and irregularly concave inferiorly; its posterior and its right sides are thickest, while its anterior and left sides terminate in a thin edge.

**ITS DIVISIONS** are into a RIGHT OR GREAT LOBE, and a LEFT OR SMALL ONE, a considerable FISSURE dividing these lobes on its inferior surface, and a broad Ligament on its superior.—There is also a considerable *Eminence* on the inferior side of its greater lobe, near the fissure which divides it from the left, denominated the LOBULUS SPIGELLII.—There are two *Foramina* on its inferior surface, one situated between the **EMINENCES OR PORTÆ** of the great lobe, which is the SINUS of the Vena Portæ, and another placed between the great lobe and the Lobulus Spigelii, which is the Sinus of the Vena Cava.—On the lower surface of the great lobe a *Depression* receives the Gall Bladder, and a *Great Notch* on the posterior edge of the liver accommodates it to the Spine and Œsophagus.

## LIGAMENTS.

The principal Ligaments of the Liver are its MIDDLE, its RIGHT, and its LEFT LIGAMENTS, which are merely continuations of the Peritoneum to its Middle, its Right and its Left sides, and one termed its ROUND LIGAMENT, which is placed in the anterior edge of its middle one, and proceeds to the Umbilicus. This last was the Umbilical Vein of the Fœtus.



## VENA PORTÆ AND INTERNAL STRUCTURE.

This Vessel arises from the Viscera of the Abdomen. Perforating the Liver, it receives a strong Coat, which is termed Capsula Glissoni; it then divides into five principal branches, and sends out numerous ramifications through the whole substance of the Liver, which, from their arrangement like the hairs of a pencil, have been denominated PENICILLI; these Penicilli are connected the PORI BILIARII, in which Bile is secreted; and these Pori Biliarii ultimately uniting, form larger tubes, which at last terminate in the HEPATIC DUCT, by which the Bile is conveyed from the Liver.

The Arteria Hepatica conveys blood to the liver solely for nourishment, and that blood is returned by the three Venæ hepaticæ.

## GALL BLADDER.

This is a small bag situated in the depression on the inferior face of the great lobe. It is of a Pyriform shape, and consists of a *Fundus* or bottom, a *Body* or middle portion, and a *neck* or narrow extremity.—The FUNDUS of the Gall Bladder is directed toward the right side of the anterior edge of the great lobe.—This bag is a reservoir of the Bile, and its Duct, termed DUCTUS CYSTICUS, unites with that of the liver, and forms

## DUCTUS CHOLEDOCHUS COMMUNIS.

This passes on to the Curvature of the Duodenum, creeps between the Coats of that Intestine, and at last opens into its cavity by an oblong aperture.

## SPLEEN.

The Spleen is a soft and spongy substance, of a long, oval form, and reddish blue colour, situated in the left Hypochondriac region, and connected to the Pancreas, the Diaphragm, the Colon, and Omentum. Its Physiology is altogether unknown.

## PANCREAS.

FORM AND SITUATION. This is a long, flat, conglomerate Gland, in figure resembling a dog's tongue, placed in the Epigastric region under the Stomach.

Its STRUCTURE is like that of the Salivary Glands; and from each of its minute portions a *Small Duct* proceeds, which terminates in a large one in the middle of the Gland, named the

PANCREATIC DUCT. This duct is thin, white, and almost transparent; it assumes a winding course in the middle of the Gland, nearer its upper than its lower part, and opens into the Ductus Choledochus, where, according to SOEIMERRING's observation, its aperture is protected by a *Valve*.

## SPLANCHNOLOGY.

### THORACIC VISCERA.

#### THORAX.

This cavity is situated between the neck and the abdomen. It is limited anteriorly by the sternum, posteriorly by the *Verbræ*, and laterally by the *Ribs*.

#### DIVISIONS.

The Thorax is divided into *Five Cavities*, viz. the ANTERIOR CAVITY of the MEDIASTINUM, the POSTERIOR CAVITY of the MEDIASTINUM, the CAVITY of the PERICARDIUM, and the GREAT RIGHT and LEFT CAVITIES of the Thorax.

#### CONTENTS.

The contents of the Thorax are the *Pleura*, the *Pericardium*, the *Heart*, the *Lungs* and *Bronchiæ*, the *Thymus Gland*, the *Œsophagus*, the *Thoracic Duct*, the *Arch of the Aorta*, the descending *Vena Cava*, the *Vena Azygos*, the *Parvagum*, and the great *Intercostal Nerve*.

#### PLEURA.

The *Pleura* is a firm membrane adhering to the internal surface of the *Parietes* of the Thorax, and investing the *Lungs*.

## DIVISIONS.

Hence it is divided into the PLEURA COSTALIS and the PLEURA PULMONALIS.—The Pleura further consists of two distinct bags, each of which covers the ribs and diaphragm, and invests the lungs of its own side, and then joining its fellow toward the middle, forms the MEDIASTINUM. This duplicature is very close toward the Sternum, to the left side of which it is attached. There is consequently but a very small space left between its layers anteriorly, and that space, the *Anterior Cavity* of the *Mediastinum*, is toward their upper part, and contains only the Thymus Gland.—It then passes backward over the Pericardium, which is there invested by its layers.—Behind the Pericardium its layers again unite, and then separating form the *Posterior Cavity* of the *Mediastinum*, which contains the Œsophagus, Bronchiæ, Great Vessels of the Heart, Thoracic Duct, Par Vagus, Great Sympathetic Nerve, Vena Azygos, and Intercostal Arteries and Veins.—The internal surface of the Pleura is moistened by a Serous Exhalation.

## PERICARDIUM.

This is the membranous capsule which contains the heart; it is of a conical form, and somewhat larger than the Viscus it includes.—It is not connected to the base of the Heart, but merely to the great Vessels arising from it.—Its other adhesions are to the Diaphragm, the Cartilages of the Ribs, the Sternum, the Pleura, and the Œsophagus.—From its internal surface a Serous Exhalation takes place, and it is this Vapour, gradually condensing after death, that forms the *Water of the Pericardium*.

## HEART.

## ITS FORM AND SITUATION.

The Heart is a hollow muscular body, of a conical form, oval at its BASE, flatted on each SIDE, and round at the APEX. It is situated within the Pericardium, between the two layers of the Mediastinum, and upon the anterior part of the Diaphragm. Its Base is turned toward the Spine, and its Apex toward the Sixth Rib of the left side, so that its *right* side is considerably *anterior*, and its *left* considerably *posterior*.

## DIVISIONS.

The Heart is divided into an anterior and posterior, or right and left cavity. - These are denominated *Ventricles*, and each of them opens toward its base by two orifices, one of which leads into a *Great Artery*, the other into another less cavity on each side the base of the Heart: these cavities are named *Auricles*, and from them, as well as from the Arteries, the Ventricles are separated by Valves. The septum of the Ventricles is named SEPTUM VENTRICULORUM, that of the Auricles is called SEPTUM AURICULORUM.

## VENTRICLES.

Of these the ANTERIOR OR RIGHT is the thinnest and softest, the POSTERIOR OR LEFT is the most muscular and firm.—The internal surface of both is extremely irregular by the projection of considerable Bundles of Muscular Fibres, called COLUMNÆ CARNEÆ, from the extremities of which tendinous filaments named CHORDÆ TENDINEÆ, proceed to terminate in the

## VALVES.

TRICUSPID VALVES which irregularly surround the Margins

of the Apertures between the Ventricles and Auricles.—The Tricuspid Valve of the left side is from its form also termed MITRAL.

The SEMILUNAR VALVES are six in number, three being placed in each Ventricle, at the mouth of its great artery. They are convex toward the Ventricles, and concave toward the Arteries. Though each of them is in itself of a perfect crescent form, yet each of the two loose edges which belong to each, and which turn up toward the artery, is of itself a small crescent; and the point in which these edges meet at the middle of each Valve forms a small *Papilla*, named from *Aranius* its discoverer.

#### GREAT ARTERIES.

That which proceeds from the left Ventricle is named AORTA, and immediately behind the semilunar Valves at its commencement are three considerable depressions called the *Sinuses of Valsalva*—that which proceeds from the right Ventricle is named the PULMONARY ARTERY.

#### AURICLES.

These are placed at the base of the Heart, and also named Right and Left. From each of them proceeds a smaller cavity with thin indented edges, and to these properly the name of *Auricles* belongs, while the greater Cavity from which each proceeds is termed *Sinus Venosus*.—The RIGHT AURICLE is larger than the left, and its whole internal surface is marked by prominent lines called MUSCULI PECTINATI, between each of which the sides of the Auricle is very thin.—Besides its opening from the Ventricle, which is surrounded by a TENDINOUS CIRCLE,—it has also another opening from the two VENT CAVÆ, between the mouths of which a slight *Eminence*



has been described, called TUBERCULUM LOWERI:—at the mouth of the inferior cava a membrane projects, named the EUSTACHIAN valve;—a small VALVE also covers the mouth of the CORONARY VEIN;—and in the septum there is a flat oval *depression* where formerly the FORAMEN OVALE was situated;—there are also sometimes visible small openings into this auricle, named FORAMINA THEBESII.—The left auricle is less capacious than the right one; in it the four PULMONARY VEINS terminate, and its opening from the ventricle is also surrounded by a tendinous circle.

### CIRCULATION OF THE BLOOD.

The circulation of the blood is affected by the alternate contraction of the auricles and ventricles, or, as it is termed, by the *diastole* and *systole* of the heart.

The term DIASTOLE expresses that contraction by which the auricles force the blood through the tricuspid valves into the ventricles, which are thereby dilated.

The term SYSTOLE expresses that contraction by which the ventricles propel, through all the arteries, the blood which is subsequently returned by the veins.

The CIRCULATION thus effected, takes place in the following manner. The blood being returned by the Superior Vena Cava from the upper part of the body, and by the Inferior Vena Cava from the lower part, is emptied into the *right Auricle*; the delicate membranous lining of which being irritated by the stimulus of the blood, contracts and discharges its contents into the *right Ventricle*; when completely filled, the right ventricle contracts, while by that contraction its tricuspid valves are shut, and its contents are propelled through the pulmonary artery into the *Lungs*, in which, becoming oxygenated, it assumes a vermilion colour, and is returned by the four pulmo-



nary veins into the *left Auricle*; which being distended, now contracts and throws its blood into the *left Ventricle*; the left Ventricle then also contracts, and contracting, its mitral valves are shut, and all its blood propelled through the Aorta into the capillary vessels of the *system*; whence, disoxygenated, and of a dark colour, it is again returned by the veins into the two *Venæ Cavæ* and the *right Auricle*, to undergo precisely the same process. The mouths of the aorta and the pulmonary artery being each protected by three semi-lunar valves, the blood is prevented passing back from them into the ventricles.

Thus the circulation is conducted in three different manners, viz. through the lungs, by the pulmonary artery and veins; through the system, by the branches of the aorta and *Venæ Cavæ*; and through the heart itself, by the coronary artery, which proceeds from the aorta immediately behind its valves, and by the coronary vein terminating in the right auricle.

Besides these, there are peculiarities in the course of the circulation of the blood, as through the liver, through the sinuses of the dura mater, and through the corpora cavernosa penis.

## LUNGS.

### THEIR SITUATION AND FORM.

The lungs are large and spongy; of a greyish colour, occupying the greater part of the cavity of the thorax, and conforming exactly to its shape, being concave toward the diaphragm, convex toward the ribs, and somewhat flattened toward the mediastinum, by which they are divided into two portions.

DIVISION.

The lungs are divided into a *right* and *left lung*, of which the former is largest, and each these great portions is subdivided into smaller portions, termed *lobes*, of which the right lung generally possesses three, and the left only two. The inferior part of the left lung is somewhat diminished by the projection of the apex of the heart, because at that part the pericardium is in contact with the ribs, against which the apex of the heart is thus permitted to strike.

GENERAL STRUCTURE.

It has been already stated that the pleura invests the whole surface of the lungs, but beneath it they have also a covering of cellular membrane. These coats invest all the rest of their structure, which chiefly consists of blood vessels from the pulmonary artery and veins, and of air vessels from the trachea.

TRACHEA, BRONCHIA, AND VESICULÆ BRONCHIALES.

The TRACHEA is a long canal commencing from the Cricoid Cartilage, and terminating in the Bronchia. It is situated in the lower part of the neck, before the Oesophagus, passes down between the layers of the Pleura, and does not divide till it has descended as far as the arch of the Aorta. Anteriorly it consists of considerable *Segments* of *Cartilaginous Circles* placed horizontally, and united by short elastic membranes, and posteriorly, the Long Aperture left between the termination of all the segments is filled by a soft *Glandular Membrane*. Besides these cartilages and membranes, muscles named *Mesochondriac* constitute a part of the Trachea: these muscles are either *Transverse* or *Longitudinal*; the transverse passing across the great posterior membrane of the Trachea, unite the ends of its

cartilaginous segments, and tend to contract its diameter; the longitudinal ones pass from the edge of one cartilaginous segment to that of another, and tend to contract its length. A highly vascular and exquisitely sensible membrane also lines the internal surface of this canal.

The BRONCHIA consist of an immense number of smaller cartilaginous portions, similarly connected by membranes and muscles; they divide into a great number of branches, which are again sub-divided, in the most minute manner, and terminate in small *Capillary Tubes*, which, enlarging at their extremities, constitute

The VESICULÆ BRONCHIALES, which are collected in bundles, the magnitude of which is proportioned to the size of the Bronchial branch producing them. Each of these cells is surrounded by an elegant arrangement of anastomosing arteries and veins, named from their discoverer *Rete Mirabile Malpighi*.

#### LOBULI AND INTERLOBULAR SUBSTANCE.

The LOBULI are formed by such a collection of minute cells as are above described, each of which communicates with another, and the smaller Lobuli combine to form larger ones, which are connected to each other by

The INTERLOBULAR SUBSTANCE; this occupies all the interstices between these small lobes, and consists of loose and fine membranous cells. When the Vesiculæ Bronchiales are inflated, this substance is compressed, and if the inflation is continued the air even passes into it; and, when the Interlobular Substance is inflated, the Lobuli themselves are compressed.

#### PULMONARY VESSELS.

The PULMONARY ARTERY dividing to the Lungs, receives the name of *Right* and *Left*, and branches minutely in each Lung,

its capillary vessels surrounding the air cells in the manner above described. The PULMONARY VEINS return the oxygenated blood. These veins, contrary to the general habit of the system, are fewer and less than the arteries. Both vessels are, within the Lungs, surrounded by the Interlobular Substance. The *Bronchial Arteries* are very small, and destined merely for the nourishment of the Lungs; the *Bronchial Veins* return their blood. The *Lymphatic Vessels of the Lungs* pass, at the Bifurcation of the Trachea, through a number of soft glandular bodies of a blackish colour, termed the BRONCHIAL GLANDS.

## LIGAMENTS.

These are one to each Lung, connecting it posteriorly to the sides of the Vertebrae of the back, as far down as the Diaphragm.

## OF RESPIRATION.

This function consists in the inhaling and exhaling the atmospheric air to or from the Lungs. The former is termed *Inspiration*, the latter *Expiration*.

IN INSPIRATION the diaphragm and intercostal muscles are relaxed, the air and blood-vessels of the Lungs are elongated, and the bronchial cells are dilated. Then the chymical change of the blood takes place.

IN EXPIRATION the air, now rendered useless, by the contraction of the diaphragm, and intercostal muscles, is expelled from the Lungs, the bronchial cells are emptied, and the air and blood-vessels of the Lungs become shortened.

## THYMUS GLAND.

This Gland is peculiar to the fœtus, and, in general, gradually disappears after birth; it is situated above the Pericar-

dium, and below the first portion of the Sternum, within the anterior cavity of the Mediastinum. No duct has been observed to this Gland, nor is its use at all understood.

### THE MAMMÆ.

The MAMMÆ or BREASTS are, in females, two soft, round eminences, placed toward the sides of the anterior part of the Thorax, their middle part being situated above the end of the sixth rib. They consist of three portions, the *Papilla* or *Nipple*, the *Areola*, and the *Body of the Mamma*.

The PAPILLA is placed in the middle of the convexity of the breast, and is largest in those who give suck; its texture consists of *Ligamentary Bundles* and *Lactiferous Tubes*, which are considerably curled up, but which are elastic, and admit of extension. The tubes are from fifteen to twenty in number, placed at a little distance from each other, and terminate in minute orifices on the top of the papillæ. The convoluted form of these tubes prevents the milk running out; in order to effect which, it is necessary to extend them.

The AREOLA is a brown circle surrounding the Papilla, containing numerous sebaceous glands, from which exudes a fluid to defend the Nipple.

The BODY OF THE MAMMA is formed by a *Conglomerate Gland*, surrounded by fat. From each portion of the Gland *Lactiferous Ducts* arise, which are invested by a membrane derived from those which pass over the internal and external surfaces of the Mamma. These ducts form a white mass in the middle of each breast, each of them being narrow at its origin, broader in its middle, and again narrow toward its termination in the nipple.

In female children and in males the Mammæ are merely cutaneous tubercles, surrounded by an areola, and their use in that situation is unknown.

## SPLANCHNOLOGY.

### PELVIC VISCERA.

The *Rectum* and *Anus* having been already described, we have merely to consider the *Generative* and the *Urinary Organs*, which last being principally situated in the Pelvis, the Kidneys, though placed in the Abdomen, are described with them.

### URINARY ORGANS.

These consist of the Kidneys with the Uretus, the Renal Capsules, and the Urinary bladder.

### KIDNEYS.

#### THEIR SITUATION, &c.

The KIDNEYS are two firm Glands placed within the Abdomen, on each side the Lumbar Vertebrae. From the magnitude of the right lobe of the Liver, the situation of the Kidney of that side is lower than that of the left. They may be divided into a concave or inner surface, in the middle of which is placed a Sinus, a convex or external surface, an anterior and a posterior side; and a superior and inferior end.

#### COATS.

The COATS of the Kidney are two; viz. a *Membrana Adiposa*, and a *Tunica Propria*, which last adheres closely to the surface of the Kidney which it even penetrates, and, after surrounding it, passes down into the Sinus upon the Vessels and accom-



panies them in their ramifications; the external surface of this coat is extremely smooth.

#### INTERNAL STRUCTURE.

The Kidney consists externally of a thick substance named *Cortical*, its middle is formed by a medullary substance called *Striata*, and to its internal part, this substance is continued under the name of *Papillary* from its terminating in ten or twelve *Papillæ* which have broad Bases and obtuse Apices. When the Kidney is compressed, small drops of Urine are discharged by very minute apertures in the points of these *Papillæ*, and pass by the ureters into the bladder, whence it is discharged at pleasure.

#### INFUNDIBULA OR PELVIS.

The INFUNDIBULA are cavities within the Kidney, the sides of each of which surround two or three *Papillæ*. These Infundibula contract in a conical way around the tops of the *Papillæ*, and, uniting within the Kidney, form three great Tubes which emerge from its sinus to terminate in the

#### URETER.

This DUCT arises from each Kidney in a direct line with the superior Tube, it passes obliquely downward and forward between the Rectum and Bladder, in which last it terminates.

The Ureter is composed of three coats, the middle one of which is muscular; it also possesses a covering from the Peritoneum.



## RENAL CAPSULES.

## SITUATION, &amp;c.

These are also Glandular bodies, of a dark yellow colour, situated somewhat toward the inner side of the upper extremity of each Kidney, being concave toward the Kidney and convex on its upper part. Along the middle of the anterior side of each, a Ridge runs from its one extremity to the other, and, on its lower side, there is a sort of Raphe.

## INTERNAL STRUCTURE.

These capsules are internally hollow. Their cavity is of a triangular form filled with a granulated substance, which chiefly adheres to the bottom of the cavity toward its upper extremity; and its sides are covered with short strong villi. It contains a brownish coloured unctuous fluid. The Veins of these Capsules are much larger than their arteries, and communicate with the internal cavity.

Their Use is altogether unknown.

## URINARY BLADDER.

## SITUATION, &amp;c.

This is a membranous and muscular bag, situated at the lowest part of the Abdomen immediately behind the Pubes and before the Rectum; it is of an ovate form, larger below than above when full, and larger above than below when empty; it consists of a *Neck* which is its lower part, a *Body* which is its middle part, and a *Bottom* or *Fundus* which is situated superiorly.

## STRUCTURE.

The Bladder consists of three proper and one partial coat.—Its PARTIAL COAT is derived from the Peritoneum, and covers merely the back, the top, and the sides of the Bladder—Its PROPER COATS are three, one *Muscular* formed by several layers of fibres, variously intersecting each other and constituting, around the neck of the bladder, the *Sphincter Vesicæ*; another *Cellular*, which resembles the Cellular Coat of the Stomach; and the last called *Villous* which lines its internal surface.

## UMBILICAL ARTERIES.

These arteries are derived from the Internal Iliacs; they are completely pervious in the Fœtus; but, in the adult, they transmit Blood no higher than their middle, whence they ascend upon the sides of the Bladder and approach each other towards its upper part.

## OPENINGS OF THE BLADDER.

This Viscus is perforated by three Foramina toward its lower part. Anteriorly the Coats of the Bladder are elongated into a canal which is termed the NECK OF THE BLADDER. The other OPENINGS are those of the URETERS, one on each side. Having passed behind the Spermatic Vessels, and the lower part of the Bladder, the Umbilical Artery lying on their outside and the Vas Deferens on their inside, they proceed between the Bladder and the Vasa Deferentia which they cross, and, passing within half an inch of each other, they perforate the Bladder, running some way between its Muscular and Cellular Coats, then opening obliquely very near each other. This

oblique aperture forms a Valve which the very contents of the Bladder itself tend to close.

#### URACHUS.

This is a round Ligament which proceeds from the middle of the Fundus of the bladder between the Peritoneum and the Linea Alba to the Umbilicus. It is thickest at its origin from the Bladder and smallest near the Umbilicus. Its use is not properly understood.

### OF THE MALE ORGANS OF GENERATION.

As the anatomical situation of these parts does not demand any particular arrangement, we shall arrange them in the Physiological order, considering first the *Scrotum* and *Testis* with its appendages, next the *Vesiculæ Seminales*, *Prostate Gland*, &c. and lastly the *Penis*.

#### TESTIS AND APPENDAGES.

##### SCROTUM.

This is a bag formed of common integuments containing Both the Testes. Externally it is covered with *Rugæ* in which are fixed *Sebaceous Glands* and numerous *Hairs*. It is divided down the middle of its external surface by a prominent line termed *Raphe* which is continued from the Perineum. Its internal surface is lined by a Cellular Membrane, a process from which, named *Mediastinum Scroti*, separates the two Testes.

##### COATS OF THE TESTES.

These are three in number, namely, the TUNICA VAGINALIS, the CREMASTER, and the TUNICA ALBUGINEA—The *Tunica*

*Vaginalis* is derived from the Vagina of the Spermatic Cord, which having passed below the Testicle, is reflected up over it and forms for it a Coat.—The *Cremaster* is a thin muscle which surrounds the whole of the Vagina, and then expands itself upon the upper external part of the Tunica Vaginalis.—The *Tunica Albuginea* is the immediate covering of the Testis.

#### THE TESTES

Themselves are of an oval figure, flatted on each side, having one extremity turned forward and somewhat upward, and the other reversely.

#### INTERNAL STRUCTURE.

The Testis is composed of numerous delicate *Tubes*, variously arranged between longitudinal *Membranous Septa* which terminate in a long white body in the edge of the Testicle; from this body they diverge, their other extremities terminating in the Tunica Albuginea. These tubes really constitute serpentine convoluted vessels. They are formed into Fasciculi of about twenty in number divided by *Cells*, from each of which a *Seminiferous Duct* proceeds. These ducts inosculate with each other, and from them ascend ten or twelve larger Ducts which connected together form

#### THE EPIDIDYMIS.

This passes along the Posterior external edge of the Testis, to which its extremities are connected; it is however so loosely connected in the middle that it almost leaves a cavity between them. It is concave toward the Testes and convex on the other side, its edges are more pointed. Its commencement is elevated from the Testis, and as it descends along the edge of that body the tubes composing it form one Duct which en-

larges as it descends to the lower part of the Testis, and again ascending in an opposite direction, lays aside its convolutions and assumes the name of

#### THE VAS DEFERENS.

This is a white flat tube which runs up in the Vagina of the Spermatic cord, behind the vessels, to the Abdominal Ring; having passed through which and arrived at the Peritoneum, it passes backward to the side of the Bladder, then immediately behind it, and downward to its neck, where it meets its fellow.

#### VESICULÆ SEMINALES.

These are soft convoluted bodies, situated between the Rectum and the inferior part of the Bladder, their superior and larger extremities diverging from the point where their less extremities meet. The whole of their external surface is covered by a delicate membrane which connects their convolutions.—Internally, they seem, on first sight, *Cellular*, but they are in reality *Tubular*, being composed of one convoluted duct, which can be easily unfolded. The whole surface of this duct is glandular, and secretes a fluid of which they are the reservoirs. Each of them terminates, along with a vas deferens, by a small opening within

#### THE PROSTATE GLAND.

This is a solid mass, situated between the neck of the bladder and the bulb of the urethra, its body lying on the rectum, and its anterior point passing forward as far as the arch of the pubis. Internally it is of a *spongy* structure, and consists of two lobes, the *Glandular Folliculi* of which open at the bottom of the

first part of the urethra, called its membranous portion. It is at this part that the *Caruncula* or *Verumontanum* is visible within the urethra; which projection is perforated by the openings of the *Vasa Deferentia* and *Vesiculæ Seminales*, and, it is on each side of this body, that five or six *ducts* open from the lobes of the Prostate.

### PENIS, &c.

This body consists of the *Corpora Cavernosa Penis*, the *Urethra*, the *Corpus Spongiosum Urethræ*, the *Glans Penis*, and the *Integuments*, with the *Preputium*.

#### CORPORA CAVERNOSA.

These are two *Ligamentary Tubes*, connected at their further extremities, and throughout the greatest part of their lengths; but diverging at their nearer extremities, which are fixed to the Rami of the Ischium and Pubis. Their cavity is filled by a cavernous substance, the cells of which open into each other. The union of these round bodies leaves a groove at their upper, and another at their lower part; the upper groove is filled by the *Vena Magna Penis*, the lower groove receives the *Urethra*, and to their extremity, the *Glans Penis*, an appendage of the same Tube, is connected.

#### URETHRA.

This is an hollow *Canal*, situated in the groove of the inferior surface of the *Corpora Cavernosa*. It commences from the anterior opening of the urinary bladder, passes beneath the symphysis of the Pubis, and proceeds upward to the Penis, terminating at the tip of the Glans.

The *LACUNÆ* of the urethra are numerous oblong foramina,



the principal ones of which are placed near the Glans. They are the *openings* of a number of *Glands* placed without the membrane of the urethra, and are all turned obliquely backward.

The ANTI-PROSTATÆ are situated between the bulb of the urethra and the accelerator urinæ on each side; their *Ducts* are long and open by two *Lacunæ*, which are considerably large, and placed in the urethra before the Caruncula.

CORPUS SPONGIOSUM URETHRÆ.

This is a spongy substance, in structure somewhat resembling the Corpora Cavernosa, forming upon the urethra a pyriform body of considerable size, at a little distance from the Pubis, named the BULB OF THE URETHRA; it then invests the membrane of that canal as far as the extremity of the Corpora Cavernosa, where it expands into the

GLANS PENIS.

This body terminates the Penis, and, although a production of the Corpus Spongiosum Urethræ, it is, in diameter, at least equal to any other part of the Penis. The glans has no communication with the Corpora Cavernosa, but the most direct one with the Corpus Spongiosum. The termination of the urethra runs along the inferior side of the glans. Its external surface is covered by a very sensible membrane, and, around the circumference of its base, are situated a number of sebaceous glands.

PREPUTIUM AND INTEGUMENTS.

These are little more than the common integuments of the body, with however but a small portion of adipose substance: Of these the *Preputium* is merely a *duplication*, reflected forward over the Glans, and may be naturally retracted. The inner



surface of the Prepuce, however, is of a delicate structure, and it is inferiorly connected to the lower side of the Glans by what is termed the *Frænum Preputii*.

There are also some other integuments, as the TUNICA NERVOSA, a yellowish elastic substance, investing the Corpora Cavernosa and the Corpus Spongiosum throughout their extent, and sending upward a broad Ligament which is inserted into the Symphysis Pubis. This Ligament is termed the *Ligamentum Suspensorium*. Another, called TUNICA CELLULOSA, surrounds more immediately the same bodies.

## OF THE FEMALE ORGANS OF GENERATION.

These are divided into *External* and *Internal Parts*. The External Parts consist of the *Pubes*, the *Labia*, the *Nymphæ*, the *Clitoris*, and the *Openings* of the *Urethra* and *Vagina*; the internal of the *Uterus* and its Appendages.

### PUBES.

The PUBES is that broad eminence situated between the Inguinal and below the Hypogastric regions, thickly covered by *Hairs*, and named sometimes the *Mons Veneris*. Its elevation is owing as much to an additional portion of adipose substance as to the convexity of the Ossa Pubis.

### LABIA.

The LABIA constitute the projecting sides of the *Sinus*, which extends from within an inch of the Anus to the inferior part of the Pubes. The points at which the Labia join are termed their *Commissures*. They consist of common integuments and an additional portion of adipose substance; they are broader and more projecting above than below, internally lined with

skin of a delicate structure, and furnished with numerous *Glands* of the *Sebaceous* kind. On the inside of each *Labium* is observable a considerable *Lacuna* which excretes a viscid fluid. The Superior Angle or Commissure of the *Labia* gives out on each side a thin Ligament, which is inserted into the Ramus of the Pubis; this is denominated the *Ligamentum Suspensorium Labii*. The inner part of the inferior angle is, from its form, denominated *Fossa Navicularis*, and the space between it and the Anus is termed *Perineum*. These are all the external parts which lie uncovered.

#### CLITORIS.

This body is situated precisely under the superior Angle of the *Labia*; laterally and superiorly it is surrounded by a *Preputium*. It consists of two *Crura* and a *Body* like the *Penis*; its *Crura* are attached to the Rami of the Pubis and Ischium, and they bifurcate at the Arch of the Pubis, to which the *Clitoris* is attached by a *Ligamentum Suspensorium*.

#### NYMPHÆ.

These lesser *Labia* extend from the *Preputium* of the *Clitoris* to the sides of the *Vagina*; they are each of them largest in the middle. They are internally of a *Glandular* and *Spongy Structure*.

#### URETHRA.

The opening of this Canal in the Female is placed below the *Clitoris* and between the commencements of the *Nymphæ*. The Female *Urethra* is much shorter than that of the male, which however it resembles in the sponginess of its structure, and is situated between the *Vagina* and the *Clitoris*, being furnished with *Lacunæ* like that of the male.

## VAGINA.

This is a Canal of much greater dimensions than the Urethra between which and the Rectum it is placed. Its internal membrane has upon it numerous transverse *Rugæ* placed both above and below, and distinctly meeting on each side. These *Rugæ* are most distinct in young women, in whom also the whole length as well as width of this Spongy Canal is less than in old persons. It passes up around the commencement of the Uterus, and its membrane is reflected back over it, so that the commencement of the Uterus projects within the termination of the Vagina, rather toward the upper part of that canal.

The HYMEN OR CIRCULUS MEMBRANOSUS is a Semilunar Membranous Fold, situated at the anterior end of the Vagina in Virgins, which leaves but a small opening from that cavity.

The CARUNCULÆ MYTRIFORMES are the remains of the Circulus Membranosus in married women.

The PLEXUS RETIFORMIS is a considerable Plexus of Vessels which descend on each side of the Clitoris, surround the Urethra, and are expanded anteriorly on each side of the Vagina.

## UTERUS.

## ITS SITUATION AND EXTERNAL FORM.

This body is situated between the Rectum and the Urinary Bladder. It is of a firm structure, about three inches in length, two in breadth at its greater extremity, but one at its lesser, and one in thickness.

## DIVISIONS.

It is divided into three portions, viz. a *NECK*, which is situated inferiorly and somewhat anteriorly, a *BODY* placed in the middle, and a *FUNDUS* or *Bottom*, which is placed superiorly and somewhat posteriorly.

## CAVITY.

Its *INTERNAL CAVITY* is of a *Triangular* form; that side of it which is turned to the *Fundus* being shortest, and the other sides which are longer being convex toward the cavity which they form.—Of its angles, the inferior one is the largest, and is perforated by a small canal which opens at the top of the *Vagina* by a *Narrow Transverse Aperture*, which is named the *OS TINCÆ* or *Os Internum Uteri*. Each of the other Angles is perforated by a *Canal* so narrow as scarcely to admit a bristle.—A *Delicate Membrane* lines the whole of its Cavity; and, in the narrow Portion or Neck of the Uterus, this Membrane is formed into an *Elevated Longitudinal Line* both on its upper and lower sides. Of these the Superior is the largest. From each side of these Lines, *Transverse Lines* cross the Canal. This portion of the Uterus is lubricated by a mucilaginous Fluid discharged by numerous *Lacunæ* placed upon its surface.

## INTERNAL STRUCTURE.

The *UTERUS* is of a firm reticular texture, and each of its sides is thickest toward the middle. It is very completely invested by a production of the Peritoneum.

## LIGAMENTA LATA.

The *BROAD LIGAMENTS* of the Uterus are formed from the production which covers its body being extended to the sides

of the Pelvis, and these duplicatures invest in their upper parts the *Ovaria* with the *Fallopian Tubes* and *Spermatic Cords*, and also the Nerves, Vessels and round Ligaments of the Uterus. The upper edge of each *Ligamentum Latum* is as it were double, constituting two lesser Ligaments.

#### OVARIA.

These are two flat, oval bodies, connected to the sides of the Fundus of the Uterus, and enclosed in the *Ligamenta Lata*. Their internal *Spongy Substance* encloses about twelve or fourteen small *Vessicles*, containing a fluid, and denominated *ova*. The *Ovaria* are fixed by short *round Ligaments* to the corners of the bottom of the Uterus.

#### FALLOPIAN TUBES.

These are two *Narrow Canals* proceeding from the Fundus of the Uterus towards the sides of the Pelvis, and are also enveloped in the broad Ligaments. They are of a conical form, the Apex of the Cone being fixed to the Uterus, and its greater extremity bending toward the *Ovaria*. This extremity terminates with a sort of *Fringé*, whence it is denominated the *Fimbriated End of the Fallopian Tube*.

### OF MENSTRUATION.

In Females, at about the thirteenth year of their age, the Blood begins to circulate with encreased energy. The Breasts swell out, and the Pubes are covered with hair. The symptoms which precede these extraordinary changes are an increased pulse, head-ach, pains in the loins, and frequently cutaneous pustules. A white fluid now distils from the Uterus, and, gradually assuming a red colour, increases in quantity.

Having continued some days, the mouths of the uterine vessels contract, a limpid fluid only passes, and at last altogether ceases. The Blood thus discharged from the System is not capable of coagulation, which no doubt depends upon its admixture with other fluids.

The same process again recurs at periods for some time uncertain, but at length becomes more regular, and takes place nearly at the end of every month, continuing periodically to do so till about the forty-fifth or fiftieth year.

A temporary suspension of the menstrual discharge is caused by Pregnancy, and even in most instances by Suckling.

## PHYSIOLOGY OF GENERATION.

The Blood is slowly conducted by the spermatic artery to the internal part of the Testicle, and arrives at the seminiferous tubes. These tubes are of a serpentine form, and, though small, are very fine and solid. They are divided by Septa into bundles about twenty in number. These Septa form distinct cells, into each of which a seminiferous duct opens to convey the secreted fluid away. Twenty or thirty of the ducts are convoluted into the form of cones connected by cellular membrane, and form the commencement of the Epididymis which then constitutes a single duct. This duct is wonderfully convoluted, and increases in magnitude as it descends to the lower part of the Testis, and still encreasing in its ascent, lays aside its convolutions and assumes the name of the Vas Deferens. This duct meets that of the Vesiculæ Seminalis at a very acute angle and opens with it into the urethra.

In the Vesiculæ Seminales the semen becomes considerably



thicker and of a deeper colour by its admixture with another fluid. The fluid, however, which is secreted by the *Vesiculæ Seminales* does not fecundate the female as we see in the Eunuch and in Geldings, which, though they possess these reservoirs, and the prostate gland, and even evacuate from them a great quantity of mucous fluid, are incapable of generating.

The fluid of the prostate gland also combines with the semen and imparts to it the white colour which it possesses.

When the semen is absorbed into the blood and not discharged in young persons, it produces some astonishing effects, such as a change of voice, the growth of hairs upon the Chin and Pubes, &c. changes which never take place in the Eunuch.

Previous to Coition, the *Corpora Cavernosa* and *Corpus Spongiosum* of the Penis are distended with blood, in consequence of the action of the Arteries being increased by irritation, and by elongation the Penis becomes straight, and is more capable of discharging the Semen. When this irritation is considerably increased, the *Vesiculae Seminales*, assisted by the *Levatores Ani*, expel their contents by a spasmodic contraction. The Semen thus passes into the Vagina, and, in prolific embraces, even into the Uterus itself. The action by which this is effected is extremely impetuous, and the whole body seems to participate in a state of convulsion. Nature seems alone occupied in directing all her powers to this function, every other seems to be forgotten, and a general languor succeeds it.

This is the share of the generative process which takes place in the male, but in the female it is enveloped in still deeper obscurity.

We have already seen that a membranous and dilatable Vagina surrounds in females the projecting mouth of the Uterus



When Women are invited by a desire of pleasure, the Muscle of this Vagina, termed its constrictor, compresses its lateral plexus, and prevents the return of the venous blood. Thus a sort of inflammation, if we may use the term, is excited, and the venereal appetite increased. In the female this appetite is perhaps less ardent than in the male, because she is at all times more ready to submit to the venereal embrace.

The Penis having entered the Vagina, excites, by friction on its sensible parts, a sort of spa-modic constriction, the return of the venous blood is retarded, the Clitoris becomes erect, the Nymphæ swell on each side, and a considerable quantity of lubricating mucus is thrown out from the Sinuses of the Vagina, the venal plexus enlarged now surrounds the whole Vagina, and the highest degree of pleasure is excited; the Semen bursts out, and is poured into the Uterus now urged with blood. The Uterus, in the highest state of irritation, attracts the Semen by a sort of aspiration, and is even supposed to contract in order to retain it. This at least has been asserted by females who have been able to remain sufficiently indifferent to notice the circumstance. Having entered the Uterus, the seminal fluid is carried along the Fallopian tubes to the Ovaria, which, stimulated by its contact, discharge by the tube an ovum into the Uterus.

## OF THE GRAVID UTERUS.

### CHANGES OF THE UTERUS FROM IMPREGNATION.

From the moment of Conception, the Uterus gradually increases in size, from the gradual increase of the ovum which it contains. The ovum however does not, at any period, en-

fully fill it, and although the size of the Uterus is increased, the thickness of its sides does not diminish. The Uterus acquires a different size in different women.

For the first three months it retains, in a considerable degree, its triangular form, but gradually becomes round as it enlarges. It generally inclines in a slight degree to one side. Its mouth, for the first three months, remains as small as before impregnation; gradually, however, the Fundus of the Uterus descends through the Pelvis, its mouth projects, and the Vagina is shortened. About the fifth month the neck of the Uterus begins to be distended, and its orifice expands, but its mouth is closed by a strong glutinous substance, which does not give way till the approach of labour, near which period of time the Cervix of the Uterus becomes perfectly distended, and its orifice forms a tube.

Between the fourth and fifth month of Pregnancy, the Fundus of the Uterus emerges from the Cavity of the Pelvis, and rises above the Pubes; in the fifth month, it extends half way between the Pubes and the Umbilicus, and the Integuments of the Abdomen become very tense; about the seventh month it reaches the Umbilicus; about the eighth, half way between it and the Scrobiculus Cordis, and about the ninth, to the Scrobiculus itself: its neck during the whole of this period gradually shortening and becoming more and more distended.

The Uterus is now of a Pyriform shape, its greater portion being uppermost, and having around it a depression which corresponds to the margin of the Pelvis, and it occupies all the Umbilical and Hypogastric regions. Its internal substance is now more soft and vascular, its veins are much larger and run in a straighter course than its arteries, which pass in a serpentine form throughout its substance, and inosculate with each other, more especially at the place where the placenta

is attached, but their connection with those of the Placenta has never been explained. Its muscular fibres are now more apparent, but they encircle in a very irregular manner. The appendages of the Uterus have now different relations to its body, seeming, from the elevation of its fundus, to pass off considerably lower. The Ligamenta Rotunda are considerably stretched, and cause pains in the Inguinal regions. Corpora Lutea are also discovered in the ovaria.

### STRUCTURE OF THE OVUM.

Soon after the passage of the Ovum into the Uterus, it adheres to its internal surface, and gradually increases in size till it nearly occupies the whole of its Cavity. Its structure gradually becomes more distinct. Its membranous part consists of three layers named the *Amnios*, the *True Chorion*, and the *False* or *Spongy Chorion*.

The AMNIOS and the TRUE CHORION are thin and transparent membranes, containing between them, in the early months of gestation, a portion of gelatinous substance, and a small sac is seen upon the Amnios near the termination of the Umbilical Cord. This little sac is filled with whitish fluid, and communicates with the Umbilical Cord by an Artery, Vein, and Duct, the termination of which has not been observed, nor its uses understood. It is denominated VESICULA UMBILICALIS.

The FALSE OR SPONGY CHORION derives a layer from the Uterus, which is termed MEMBRANA DECIDUA, while the other portion is named DECIDUA REFLEXA. The Membrana Decidua corresponds to the inner surface of the Uterus, and is perforated by three foramina corresponding to its three openings. These two last membranes are much thicker than the others

which include within them a fluid called the *LIQUOR AMNII* in which the Embryo is suspended.

In the first months of uterogestation, the membranes are large in proportion to the fœtus; but in the subsequent months, the proportions are exactly reversed. The Placenta however does not much increase after the middle of the seventh month.

### EVOLUTION OF THE EMBRYO.

The first parts of the Embryo which appear are its heart and liver, then its brain and spinal marrow, next the abdominal viscera, and, at last, the extremities gradually appear. The heart first discovers itself as a small moving point.

The growth of the fœtus seems to advance more rapidly in the early than in the latter months. An embryo of four weeks is about the size of a common fly, its viscera seem covered merely by a transparent membrane, and it hangs by the umbilicus. One of six weeks is about the size of a bee, its head being larger than its body, and its extremities just appearing. About eight weeks, it is about the size of a common bean, and its extremities project a little. About twelve weeks, it is nearly three inches in length, and its formation is somewhat more distinct. About four months, its length is five inches, at five months six or seven inches, at six months eight or nine inches, at seven months between eleven and twelve, at eight between fourteen or fifteen, and at nine months from eighteen to twenty-three inches.

### PARTICULAR DESCRIPTION OF THE PARTS OF THE ADVANCED OVUM. V.

These parts are the *Placenta*, the *Umbilical Cord*, the *Membranes* and the *Fluid* they contain.

*PLACENTA.*

The *PLACENTA* is a soft and extremely vascular mass, having one of its sides attached to the Uterus and its other giving rise to the Membranes and to the Umbilical Cord. It is thickest in the middle, and thinner toward the edges. The vessels of which it consists are extremely minute. Its external or convex side has a lobular structure. Its internal or concave side is in contact with the Chorion. The minute vessels of its internal substance, having frequently inosculated in each other, unite to form the Umbilical Cord.

The point of adhesion of the Placenta to the Uterus is extremely irregular, but it rarely covers its orifice, and the most common point of attachment is toward the fundus. Twins have sometimes distinct Placentæ, but when they have only one, though the Chorion be common to both, each has its distinct Amnios.

*UMBILICAL CORD.*

By means of this, the fœtus is connected with the Placenta. The Umbilical Cord consists of two arteries and one vein, the membranes of which are derived from the Placenta, and filled with a firm gelatinous substance. It generally arises near the middle of the Placenta, and terminates at the umbilicus of the fœtus. Its shape is twisted. Its thickness resembles that of a common finger, and its length is very irregular. Its use is to convey nutriment to the fœtus.

*MEMBRANES.*

These constitute a strong bag, lining the uterus, surrounding the fœtus, and consisting of several layers, as already men-

tioned, namely, the Membrana Decidua, the Decidua Reflexa, the true Chorion and the Amnios.

#### MEMBRANA DECIDUA.

This is the layer of the Spongy Chorion which is in contact with the Uterus. It is thick and vascular, separated at first from the Decidua Reflexa by a quantity of gelatine, but gradually approaches, and, about the fifth month, is so connected to it as to become one membrane.

#### DECIDUA REFLEXA.

This membrane is thickest and most vascular in the neighbourhood of the Placenta, and constitutes what Dr. Hunter terms its external or maternal portion. In early gestation, it is separated from the last mentioned membrane, but in advanced gestation, it is intimately connected to it.

Both portions of the Decidua are extremely vascular. Dr. Hunter believes that they are derived from the Uterus, and line it in the same manner as the Peritoneum lines the cavity of the Abdomen, and that the ovum is enveloped merely in its duplicature, and consequently is placed on its outside. Scarpa, however, is of opinion that it owes its origin to coagulable lymph.

#### TRUE CHORION.

This membrane is much more smooth and transparent than those above mentioned. It adheres to the concave surface of the Placenta, and gives a coat to the Umbilical Cord.

#### AMNIOS.

This is the thinnest and most transparent of all the membranes. It is situated internal to the rest, and forms the exter-



nal coat of the Umbilical Cord. Its vessels are hardly discoverable. It is upon this membrane that the VESICULA UMBILICALIS exists, being placed between the Amnios and Chorion, near the commencement of the Cord. It is observable only in the early months of gestation.

## LIQUOR AMNII.

This fluid is contained within the Amnios. It is of a saltish taste, most limpid in the first months, becoming coloured and viscid in the subsequent ones, and proportionally diminishing as pregnancy advances. That fluid which sometimes collects between the Chorion and Amnios is called *the false water*.

## POSITION OF THE FŒTUS IN THE UTERUS.

The fœtus is here adapted to the form of the cavity which contains it. The spine is bent, the head rests upon the knees, the knees are drawn up, the heels are folded backward, and the arms encompass the legs. Thus collected together, the head of the child is turned downward, from its being much heavier than its other parts. The crown of the head is therefore directed toward the Os Tincæ; one ear is turned to the Pubis, the other to the Sacrum.



## SPLANCHNOLOGY.

### PECULIARITIES OF THE FŒTUS.

The most remarkable peculiarities of the Fœtus are the *Membrana Pupillaris* of the Eye, the *Membrana Mucosa* of the Ear, the *Foramen Ovale* of the Heart, the *Canalis Arteriosus*, the *Canalis Venosus*, the *Thymus Gland*, the *Umbilical Vein*, and two *Umbilical Arteries*.

#### MEMBRANA PUPILLARIS.

This delicate Membrane arises from the edge of the Iris, and completely fills up the Pupil. It is thin and almost quite transparent, and generally disappears about the eighth month.

#### MEMBRANA MUCOSA.

This membrane is situated at the bottom of the *Meatus Auditorius Externus*, and covers the external surface of the *Membrana Tympani*. It scarcely disappears even by the ninth month.

#### FORAMEN OVALE.

This is an oval opening in the *Septum Auricularum*, by which the blood passes from the right to the left auricle. It is protected by a valve which prevents the passage of the blood in any other direction. In the adult, this foramen is almost

completely obliterated, although its situation may always be perceived.

### CANALIS ARTERIOSUS.

This artery connects the Pulmonary to the ascending aorta and transmits the Blood, which cannot pass through the Lungs, from the right ventricle into the aorta.

### CANALIS VENOSUS.

This Vein is little more than half an inch in length, and passes from the Sinus of the Vena Portæ into the inferior Vena Cava.

### UMBILICAL VEIN.

This vein passes from the umbilicus to the liver.

### UMBILICAL ARTERIES.

These arise from the internal iliac arteries and pass up the sides of the bladder to the Umbilicus.

### THYMUS GLAND.

This body has already been described with the Thoracic Viscera.

### FŒTAL CIRCULATION.

The Blood is conveyed to the fœtus through the Umbilical Vein from the mother, and then passes by the Ductus Venosus into the Vena Cava to the right auricle. From this auricle, it partly passes into the right Ventricle, but partly also through

the foramen ovale in the left auricle, and thence into the Ventricle of the same side. The portion which passes into the right ventricle is transmitted through the Pulmonary Artery to the lungs, or, from it, through the canalis arteriosus into the aorta. Returned by the Pulmonary Veins into the left auricle, it thence passes into the left Ventricle, whence it is transmitted along with that which passed by the Foramen Ovale through the Aorta to the whole system and returned by the Veins. To the mother the blood is returned by the Umbilical Arteries and through the Cord.

## ANGIOLOGY.

The VESSELS of the Human Body consist of *Arteries, Veins,* and *Absorbents.* As the Arteries are the most important of these, it will be proper to consider them first.

### OF THE ARTERIES.

The ARTERIES are long, *Elastic* and *Pulsating Tubes*, the diameters of which decrease according to the number of branches which they give off.

The COATS OF THE ARTERIES are three in number, an external or CELLULAR COAT, a middle or MUSCULAR COAT, and an internal or smooth MEMBRANOUS COAT.

The USE OF THE ARTERIES is to convey Blood from the Heart, through the Lungs, throughout the system in general, or to the Heart itself.

The ORIGIN of the two great Trunks from which they all arise has already been explained, and of these two all the rest are branches.

### AORTA.

The AORTA arises by a white line, called *Tendo Arteriosus*, from the superior posterior part of the left ventricle. Ascend-

ing, it passes to the right, beyond the Pulmonary Artery, then gradually bends to the left and passes in an arch-like form to that side of the vertebræ, and lastly descends in a straight line to perforate the Diaphragm. Having passed into the Abdomen, it proceeds upon the middle of the vertebræ, to the last vertebræ of the loins where it divides.

The first portion of the aorta is termed its *ARCH*, that which passes in the Thorax is named *Thoracic*, and that which descends in the Abdomen is denominated *Abdominal*, and in both of these situations it is termed *DESCENDING*.

Before the formation of the arch, two small arteries proceed from the aorta above its interior and posterior semilunar valves; they are denominated the *Coronary Arteries of the Heart*. The *RIGHT OR INFERIOR CORONARY ARTERY* is the largest, it passes between the right Auricle and Ventricle, over the inferior surface, to the Apex of the Heart. The *LEFT OR SUPERIOR CORONARY* which passes between the left Auricle and the Pulmonary Artery, is distributed partly to the Convex and partly to the flat surface of the Heart, inosculating with the right.

## BRANCHES FROM THE ARCH OF THE AORTA.

These are three, viz. 1st. the ARTERIA INNOMINATA ; 2nd. the LEFT COMMON CAROTID ; and 3d. the LEFT SUBCLAVIAN.

The *Arteria Innominata* soon subdivides into the RIGHT SUBCLAVIAN and the RIGHT COMMON CAROTID.

The COMMON CAROTID ARTERIES are situated upon the anterior surface of the cervical Vertebrae between the Intercostal Nerve and Par Vagus below, and the Jugular Vein above, passing parallel to the Trachea. At the superior edge of the Thyroid Cartilage, it divides into two branches, viz. the *External Carotid* which is anterior, and the *Internal Carotid* which is posterior.

## ARTERIES OF THE HEAD.

### EXTERNAL CAROTID.

This Artery soon divides into *Eight* considerable branches, which are

1. The THYROIDEA SUPERIOR OR DESCENDENS which passes, in a winding direction, to the Thyroid Gland, but previously gives off an *Ascending*, a *Descending*, and an *Internal* or *Laryngeal Branch*.

2. The LINGUAL ARTERY which winds forward to the Tongue, above the Os Hyoides. Its most important branches

are, 1. A *Hyoidal Branch*; 2. The *Dorsalis Linguae* to the back of the Tongue; 3. The *Sublingualis* which passes below it; and 4. The *Raninal Artery* which passes in a convoluted manner through the internal substance to the tip of the Tongue.

3. The **FACIAL ARTERY** which arises behind the Tendon of the Digastric Muscle, and ascends, by the anterior edge of the masseter, over the lower Jaw, passes up on the face by the side of the nose, and terminates in an anastomosis at the internal angle of the Eye. Its chief branches are, 1. The *Ascending Palatine* lying on the Pharynx; 2. The *Submental Artery* which passes superficially beneath the Jaw; 3. The *Masseteric Branch* to the Masseter; 4. The *Inferior Labial* to the lower Lip; and, 5 and 6. The *Inferior* and *Superior Coronary Arteries of the Lips* which pass in their edges and join those from the other side.

4. The **ASCENDING PHARYNGEAL** which next arises from the back of the Trunk, and ascends upon the Rectus Anticus Major. It is a very small artery.

5. The **OCCIPITAL ARTERY** which passes before the Jugular Vein, and behind the mastoid process to the Occiput, giving off, 1. A *Meningeal Artery* to accompany the Jugular Vein; 2. An *Auricular Artery*; 3. A *Cervical Artery*.

6. The **POSTERIOR AURIS**, which is given off from the Trunk within the Parotid Gland, and passes transversely behind the ear. From it arise, 1. *Branches to the Parotid*; 2. An *Artery to the Membrana Tympani*; and 3. The *Arteria Stylo-Mastoidea*.

7. The **TEMPORAL ARTERY** which passes through the Parotid Gland, extends above the Zygoma and divides into a great *Anterior* or *Frontal*, and a great *Posterior* or *Occipital Branch*. Its other considerable branches are, 1. The *Transversalis Faciei*, inosculating with the Facial; 2. The *Deep Temporal*,



which passes below the Temporal Aponeurosis; 3. The *Anterior Auricular Arteries*.

8. The INTERNAL MAXILLARY ARTERY which, about the middle of the Ramus of the Jaw, bends inward, forward, and downward, again ascends forward to the Spheno-Maxillary fissure. Its principal branches are, 1. The *Arteria Meningea Media* which enters the Cranium through the Foramen Spinosum, to be expanded upon the Dura Mata; 2. The *Inferior Maxillary Artery* which descends to pass through the Canal of the lower Jaw; 3 and 4. The two *Deep Temporal Arteries*; 5. The *Alveolar Artery* to the Alveolar processes of the upper Jaw; 6. The *Infra-Orbital Artery* which enters the Spheno-Maxillary fissure, and passes along the canal in the bottom of the Orbit, immersing through the Infra-orbital Foramen; 7. The *Superior Palatine* which goes to the Palate; 8. The *Upper Pharyngeal* proceeding to the Pharynx; and 9. The *Nasal Artery* which perforates the Spheno-Palatine fissure to the cavity of the Narcs.

### INTERNAL CAROTID.

The INTERNAL CAROTID ARTERY separates from the external, at the upper edge of the Thyroid Cartilage, or opposite the angle of the Jaw. It is placed between the eighth pair of nerves, and the great Sympathetic before, and the Rectus Anticus Major behind. It ascends to the Foramen Carotideum without giving off any branches, and there forms various convolutions; passing through the Cavernus Sinus, it at last perforates the Dura Mater, and is distributed into the Cerebrum. The first important branch which it gives off, after having perforated the Canalis Caroticus, is

1. The OPHTHALMIC ARTERY, which passes from the point where the Carotid Artery leaves the Dura Mater, and, along with the Optic Nerve, goes through the Foramen Opticum, giving off the *Ciliary Arteries* to the eye, the *Supra Orbital* to the forehead, the *Arteria Centralis Retinæ* to the expansion of the Optic Nerve, &c.

2. The ARTERIA COMMUNICANS, which, with the Vertebral, forms the *Circle of Willis*.

3. The ARTERIA ANTERIOR CEREBRI, which, uniting with its fellow before the Sella Turcica, completes the *Circle of Willis*, and sends a great branch over the Corpus Callosum.

4. The ARTERIA MEDIA CEREBRI, which runs in the Fissura Sylvii, between the lobes of the Brain, giving off the *Artery of the Choroid Plexus*, and branches to both lobes.

## ANGIOLOGY.

### ARTERIES OF THE UPPER EXTREMITIES.

#### SUBCLAVIAN ARTERY.

This Artery emerges from the Trunk at the upper edge of the first Rib, and, passing outwardly between the first and second Scaleni, is hid by the Clavicle and by the Pectoral muscle. It then bends its course to the Axilla. The branches of this Artery are excessively irregular: in general, however, it gives off Six Branches, in the following manner.

1. The INTERNAL MAMMARY ARTERY, which proceeds from the lower part of the base of the Trunk, and bends downward to pass under the middle of the Cartilages of the Ribs; ultimately perforating the Diaphragm, it anastomoses upon the Rectus Abdominis with the Epigastric Artery. From it proceed the *Arteria Thymica*, the *Arteria Comes Nervi Phrenici*, the *Pericardiac*, and the *Phrenico-Pericardiac Branches*.

2. The INFERIOR OR ASCENDING THYROID Artery, which is given off from the Trunk anteriorly. Its branches are, first, The *Transversalis Humeri*, frequently of considerable size, passing under the Sterno Cleido Mastoideus and the Trapezius to the Scapula, through the notch on the Superior Costa of which it often passes, and becomes the *Supra-Scapular*; second, The *Transversalis Colli* or *Cervicis*, which passes transversely up the neck, where it is concealed by the Trapezius; third, The

*Ascending Thyroid Artery*, which passes up between the Rectus Major and the Scaleni; fourth, The *Ramus Thyroideus*, which winds toward the Thyroid Gland, and inosculates with the superior Thyroid.

3. The SUPERIOR INTERCOSTAL ARTERY, which arises from the superior posterior part of the Trunk, externally to the following Artery; ascending between the bodies of the Vertebrae and the Scalenus, it passes down into the Thorax, and is distributed to the first and second Intercostal spaces.

4. The VERTEBRAL ARTERY, which branches from the upper part of the Subclavian, and ascends to the foramen of the Transverse Process of the last Cervical Vertebra, passes up in the canal formed by these Transverse Processes and having made numerous convolutions, enters the Foramen Magnum. It then proceeds forward and upward, and, upon the Cuneiform Process of the Os Occipitis, unites with its fellow to form the *Basilary Artery*, from which immediately proceeds the *Posterior Artery of the Cerebellum*. It next gives off the two *Anterior Arteries of the Cerebellum*, and, lastly, the two *Posterior Arteries of the Cerebrum* which join the communicating arteries.

5. The DEEP CERVICAL ARTERY, which passes upward and backward among the deep seated muscles of the neck.

6. The SUPERFICIAL CERVICAL ARTERY, which passes backward and downward among the superficial muscles of the neck.

### AXILLARY ARTERY.

Having passed beneath the Clavicle, the Subclavian Artery assumes the name of Axillary, and, placed in the Axilla, amidst nerves, veins, and fat, between the Pectoral, the Serratus and Subscapular Muscles, it gives off the Thoracics, and other three considerable arteries.

1. The *Thoracic Arteries*, which are four in number; the *Superior*, the *Long*, the *Humeral*, and the *Alar Thoracic*, which are the first branches given off.

2. The *Infra-Scapular Artery*, which arises at the lower edge of the Subscapularis, and passes partly behind and partly before the Scapula.

3. The POSTERIOR CIRCUMFLEX ARTERY, which arises between the Teres Major and Subscapularis, and surrounds the neck of the Humerus, under the Long Head of the Triceps, and under the Deltoid. From it the following artery sometimes arises, and also the Profunda Humeri.

4. The ANTERIOR CIRCUMFLEX ARTERY arises above the Teres Major, and surrounds the anterior part of the Humerus. It is much less than the former.

### BRACHIAL ARTERY.

Having passed the lower edge of the tendon of the Latissimus Dorsi, the Axillary Artery assumes the name of Humeral, which now passes above the Brachialis Internus, and along the inner side of the Biceps to the lower part of the Arm. It gives off three principal branches.

1. The PROFUNDA HUMERI SUPERIOR, which arises at the lower edge of the Teres Major, passes first backward and then downward, accompanying the Long Head of the Triceps. It gives off, first, The *Communicating Radial*, which anastomoses with the Radial Recurrent; and, second, The *Communicating Ulnar*, which anastomoses with the Ulnar Recurrent.

2. The PROFUNDA INFERIOR, which rises lower down from the outside of the Trunk, and, penetrating the Brachialis Internus, passes to the outer Condyle.

3. The ANASTOMOTICUS MAGNUS, which arises about three

inches above the elbow joint, from the inner side of the Trunk, and inosculates about that joint.

### ULNAR ARTERY.

Having arrived near the bend of the Arm, the Brachial Artery divides into the Ulnar and Radial Arteries. The Ulnar descends, with the tendon of the Biceps, passes under the Pronator Radii Teres, the Flexor Carpi Radialis, the Flexor Sublimis and the Palmaris Longus, and proceeds between the Flexor Carpi Ulnaris and the Flexor of the Fingers to the Wrist, where having passed, it principally contributes to form the *Arcus Superficialis*. Its chief branches are,

1. The ULNAR RECURRENT ARTERY, which, behind the internal Condyle, ascends to anastomose with the Anastomoticus Magnus.

2. The COMMON INTEROSSEAL, which sends down the *Anterior Interosseal* on the front of the Interosseous Ligament, and afterwards behind the Pronator Quadratus, at the lower part of which, it emerges to the back of the Wrist, and also the *Posterior* or *Perforating Interosseal*, on the back of the same Ligament.

3. The DORSALIS MANUS, which bends round the inferior end of the Ulna to the back of the Hand, and to the outside of the little Finger.

4. The PROFUNDA MANUS, which passes anteriorly to the deep Palmar Arch.

5. The SUPERFICIAL PALMAR ARCH, which is properly the continuation of the Artery. This sends off branches over the Interstice between each Metacarpal Bone, each of these again subdividing into two branches to the contiguous sides of two



*Fingers*, and also a branch called *Anastomotic*, which unites with the Radial Artery.

### RADIAL ARTERY.

This Artery descends over the Pronator Radii Teres, and then between the Flexor Carpi Radialis and the Supinator Radii Longus. At the lower part of the Radius it passes backward and between its Styliform Process and the Os Trapezium, and below the Extensor Tendons of the Thumb, then passes to the Palm, through the Abductor of the Fore Finger, and forms the Deep Palmar Arch. Its principal branches are,

1. The RADIAL RECURRENT, which ascends behind the External Condyle to anastomose with the lesser Profunda.

2. The SUPERFICIALIS VOLÆ, which is given off at the lower end of the Radius.

3. The DORSALIS POLLICIS, which passes over the back of the Thumb.

4. The RADIALIS INDICIS, distributed about that finger.

5. The MAGNA POLLICIS, arising from the Trunk as it passes through the muscle, from the back of the Hand, and being distributed to the muscles before the Thumb.

6. The PALMARIS PROFUNDA, which, by inosculating with the Profunda Manus of the Radial, forms the *Deep Palmar Arch*, and, like the superficial one, distributes arteries to the *Fingers*.



## ANGIOLOGY.

### *BRANCHES OF THE DESCENDING AORTA.*

The Descending Aorta is, from its situation, naturally divided into the *Thoracic* and *Abdominal*.

### ARTERIES OF THE THORAX.

Here the Aorta is situated toward the left sides of the bodies of the *Vertebræ*, and gives off, in its course, several small branches, the most considerable of which are

#### BRONCHIAL ARTERIES.

These go to nourish each of the Lungs.

#### ŒSOPHAGEAL ARTERIES.

These are four or five in number, and are distributed to the Œsophagus.

#### INFERIOR INTERCOSTALS.

These are distributed to the Intercostal Spaces. The right ones, as they must cross the bodies of the *Vertebræ*, are the longest.

## ARTERIES OF THE ABDOMEN.

The Abdominal Aorta commences from the passage of the Vessel through the Diaphragm. Passing between its Crura, it is separated from the Vena Cava, but again approaches that Vessel in its descent. Its chief branches are the

## RIGHT AND LEFT PHRENIC ARTERIES.

These are distributed to the Diaphragm.

## COELIAC ARTERY.

This artery arises short and thick, between the Crura of the Diaphragm, and divides into the *Coronaria Ventrîculi*, the *Hepatic*, and the *Splenic Artery*.

1st. The CORONARIA VENTRICULI passes forward to the lesser Arch of the Stomach, and then dividing toward each of its sides, forms a sort of Corona. Its principal branches are 1st, a *superior* one to the great extremity of the Stomach; 2nd, the *Superior Pyloric* distributed to the Pylorus.

2nd. The HEPATIC ARTERY arises from the right side of the Coeliac, and proceeds upward to the same side for about an inch and half, then divides into the right and the left Hepatic Arteries, but previous to its division it gives off, 1st, the *Pylorica Inferior* to the Pylorus; 2nd, the *Duodeno-Gastric*, which sends off the *Pancreatico-Duodenalis* to the inner Curvature of the Duodenum and the neighbouring parts of the Pancreas, and also the *Right Gastro-Epiploic* to the greater Curvature of the Stomach, where it anastomoses with the left from the Splenic; 3d, the *Superior Hepatico-Pyloric*, which inosculates with the Pyloric from the Coronary Artery.—The *Left Hepatic* is the smallest branch of the two into which the Trunk now divides;

entering the Umbilical Fossa of the Liver, it is distributed in numerous branches.—The *Right Hepatic* is somewhat hid by the Ducts of the Liver: it is distributed chiefly to the Right Lobe, but previously gives off the *Arteria Cystica*.

3d. The SPLENIC ARTERY runs transversely along the upper edge of the Pancreas, in a convoluted form, to the great Fissure of the Spleen. Its principal branches are, 1st, the *Great Pancreatic*; 2d, *Lesser Pancreatics* given off throughout its course; 3d, *Posterior Gastrics* passing from the middle of its Trunk to the back of the great extremity of the stomach; 4th, the *Left Gastro-Epiploic*, which bends downward to the greater Curvature of the Stomach, and inosculates with the right from the Coeliac; 5th, the *Vasa Brevia* to the Great Extremity of the Stomach.

#### SUPERIOR MESENTERIC.

This artery arises from the Aorta, between the Crura of the Diaphragm, less than half an inch below the Coeliac. It passes between the Pancreas and the last Flexion of the Duodenum, and is received between the layers of the Mesentery. Its branches then expand somewhat like a fan, being shorter toward the left side, whence the small intestines are supplied, but longer toward the right, whence two branches pass to the great intestines; these are, 1st, the *Colica Superior* or *Dextra*; and, 2d, the *Ileo-Colica*.—The first of these branches forms the *Great Mesenteric Arch* by inosculating with the *Colica Sinistra* of the Inferior Mesenteric.

#### RENAL OR EMULGENT ARTERIES.

These arise from the sides of the aorta between the superior Mesenteric and the Spermatic arteries. The *Left Renal Artery* is shorter than the right and turns over its Vein, while

the *Right* which is longer is covered by its Vein. Dividing into several branches they pass into the Sinus of the Kidney.

### SPERMATIC ARTERIES.

These are very long and slender, arising from the aorta between the Renal and inferior Mesenteric, the *Left* often rising higher than the *Right*, and sometimes even from the Renal of that side. Forming an acute angle with the Trunk of the Aorta, they descend behind the Peritoneum, through the Abdominal ring, to the Testes. In females they do not pass through the ring, but to the Ovaria.

### INFERIOR MESENTERIC.

This artery arises between the Renal and common Iliac arteries, rather from the left side of the Trunk, and is expanded toward the left side of the Abdomen. Its principal branches are the *Colica Sinistra* which anastomoses with the superior Mesenteric, and the *Internal Hæmorrhoidal* which descends along the back of the Rectum.

### LUMBAR ARTERIES.

These are five on each side. They arise from the lateral and posterior part of the Aorta between the bodies of the Lumbar Vertebrae, and are distributed to the muscles of the loins.

## ANGIOLOGY.

### *BRANCHES FROM THE TERMINATION OF THE AORTA.*

At the last Lumbar Vertebra, the Aorta divides into *two great and one small branch*.—The small branch is denominated the *ARTERIA SACRO-MEDIA*. It arises exactly at the point where the Aorta divides into the two large Iliacs and passes down the middle of the Sacrum—The *RIGHT COMMON ILIAC ARTERY* passes over the inferior part of the Vena Cava—The *LEFT* does not cover its accompanying Vein, but rests on its outside—Both of them divide into two branches, namely, the *Internal Iliac* or *Hypogastric* which passes into the Cavity of the Pelvis, and the *External Iliac* which passes to the Thigh and becomes the Femoral.

## ARTERIES OF THE PELVIS.

### INTERNAL ÍLIAC.

This artery passes into the Pelvis behind the Peritoneum, between the Ilium and Sacrum. Its branches generally arise in the following order :

1. The *ILEO-LUMBAR* passing near the Crista of the Ilium between the Psoas Magnus and Iliacus Internus.
2. The *SACRO-LATERAL ARTERIES* which pass to the sides of the Sacrum.
3. The *UMBILICAL ARTERY* which, in the Fœtus, was much more capacious, constituting the Trunk of the Hypogastric

artery. It is distributed to the Bladder, but its Ligamentous part passes up to the Umbilicus.

4. The INFERIOR VESICAL to the lower part of the Bladder.

5. The MIDDLE HÆMORRHOIDAL ARTERY to the lower part of the Rectum.

6. The UTERINE ARTERY, peculiar to the Female, distributed to the sides of the Uterus.

7. The OBTURATOR ARTERY, which passes downward and forward along the superior edge of the Obturator Internus, and, penetrating the notch of the Ligamentum Obturatorium, is distributed to the great muscles of the Thigh. This artery sometimes arises from the Epigastric.

8. The GLUTEAL ARTERY is the largest of those which arise from the internal Iliac. It passes out of the Pelvis, along the superior edge of the Piriformis, by the great Sacro Sciatic Foramen, and is distributed upon the Dorsum of the Ilium.

9. The ISCHIATIC ARTERY, less than the former, passes from the Pelvis between the Levator Ani and the lower edge of the Piriformis, and descends under the Gluteus Maximus, giving off the *Coccygeal Artery*, and expanding upon the Hip and Thigh toward its upper posterior part.

10. The ARTERIA PUDICA COMMUNIS, sometimes arising from the Ischiatic, passes out of the Pelvis between the Levator Ani and Piriformis, then descends under the great Sacro-Sciatic Ligament toward the Spine of the Ischium, where it re-enters the Pelvis by the lesser Sacro Ischiatic Foramen and passes up along the internal edge of the Tuberosity and ascending Ramus of the Ischium. The chief branches which it gives off are, the *External Hæmorrhoidal* to the Arms, the *Arteria Perinei* to the Perineum, and the *Arteriæ Penis*, named *Dorsales* and *Profundæ*, the former passing to the back of the Penis, the latter to its Corpora Cavernosa, and Corpus Spongiosum.

## ANGIOLOGY.

### ARTERIES OF THE LOWER EXTREMITIES.

#### EXTERNAL ILIAC.

This Artery, having branched off from the internal, passes behind the Peritoneum over the edge of the Psoas Magnus. It descends upon this muscle and the Iliacus Internus, behind the Iliac Vein, and internal to the Crural Nerve. The branches which it gives off in its course are, first, The *Epigastric*, which rises from the inner side of the Trunk near the external margin of the Abdominal Ring, and the lower part of Poupart's Ligament. It first descends, and is then turned backward and inward behind the inner side of the Spermatic Cord: from this it ascends by the outer and upper angle of the Abdominal Ring, and passes inward toward the Rectus Abdominis, anastomosing upon it with the internal Mammary. The second branch given off is the *Circumflexa Ilii*, which, passing outward under the Peritoneum, bends along the Crista of the Ilium and is distributed to the Abdominal Muscles.

#### FEMORAL ARTERY.

Having passed under Poupart's Ligament, the External Iliac assumes the name of FEMORAL. This artery is situated under the vein of the same name, and is covered by the Fascia of the



Thigh. Having advanced about two inches from the Ligament, it divides into the *Superficial* and the *Deep-seated Femoral*.

The COMMON TRUNK gives off several *Pubic Arteries* and small vessels to the Integuments. The first of its portions, therefore, which deserves attention, is the

### PROFUNDA FEMORIS.

This artery, bedded in fat, passes down through the triangular cavity between the Iliacus Internus, the Pectineus and Triceps; it then passes forward between the Vastus and the shorter heads of the Triceps, and runs back to the middle of the Thigh, where it is distributed among the posterior muscles. Its branches are,

1. The EXTERNAL CIRCUMFLEX which passes outward beneath the external muscles, around the upper part of the Femur.
2. The INTERNAL CIRCUMFLEX which arises from the inner posterior part of the Trunk and passes inward beneath the internal and posterior muscles, surrounding the upper part of the Femur above the Trochanter Minor.
3. The FIRST PERFORANT and
4. The SECOND PERFORANT, which pass to the back of the thigh and inosculate with branches of the Ischiatic and Gluteal Arteries.

### SUPERFICIAL FEMORAL ARTERY.

The situation of this artery is considerably external. It is covered above by the Fascia and Inguinal Glands; at its middle part, by the Fascia and the Sartorius; and at its lower part, it is covered by the Aponeurosis of the Great Heads of the Triceps where it is situated in a cavity between the Vastus Internus and the Adductors of the thigh. Its course

is first downward, then inward, and lastly backward. The chief branches which it gives off are

1. The *RAMUS ANASTOMOTICUS MAGNUS* which rises from the inside of the trunk before it passes into the Aponeurotic canal of the Triceps, and passes down convolutedly upon the *Vastus Internus*.

2. The *SUPERIOR PERFORANT* arising within the canal of the Triceps.

3. The *INFERIOR PERFORANT* arising a little below the former. Both inosculate with the superior Perforants and with the Articular Arteries.

### POPLITEAL ARTERY.

Having passed through the Tendon of the Triceps into the Ham, the Femoral Artery acquires the name of Popliteal, which descends somewhat obliquely between the Condyles of the Femur and the heads of the *Gastrocnemii*, over the posterior part of the Capsular Ligament and of the Popliteal Muscle. This artery gives off

1. The *SUPERIOR EXTERNAL ARTICULAR*,
2. The *SUPERIOR INTERNAL ARTICULAR*,
3. The *MIDDLE OR AZYGOS ARTICULAR*,
4. The *INFERIOR EXTERNAL ARTICULAR*,
5. The *INFERIOR INTERNAL ARTICULAR*, and
6. Several *MUSCULAR BRANCHES*, the principal of which go to each head of the *Gastrocnemii*.

### ANTERIOR TIBIAL ARTERY.

This Artery arises from the Popliteal, at the lower edge of the Popliteal Muscle, and passes through the Interosseous Ligament into the Anterior part of the Leg. Upon this Ligament it descends first between the *Tibialis Anticus* and the

Extensor Communis Digitorum, and then between the Tibialis Anticus and the Extensor Longus Pollicis. It then leaves the Ligament and passes forward and inward over the inferior end of the Tibia. Accompanying the Extensor Tendons under the Crucial Ligament, it disappears between the first and second Metatarsal Bones. The chief branches which it gives off are

1. The TIBIAL RECURRENT which ascends to the anterior part of the Knee, inosculating with the Inferior Articular.
2. The MALLEOLARIS INTERNA which is expanded upon the Inner angle and inosculates with the Internal Plantar Artery.
3. The EXTERNAL MALLEOLAR which is distributed about the Outer angle and inosculates with the anterior and posterior fibular arteries.
4. The TARSAL ARTERY which descends from the outer part of the Trunk and anastomoses with the External Plantar upon the lower Bones of the Tarsus forming the Tarsal arch, from which branches proceed toward the Toes.
5. The METATARSAL ARTERY which passes Transversely over the Metatarsal Bones, and terminates about the Abductor of the little Toe and the Peroneal Tendons.
6. The EXTERNAL DORSAL ARTERY of the great Toe which is given off where the artery is descending into the Sole of the Foot.
7. The DEEP ANASTOMOSING BRANCH which is the continuation of the Trunk into the Sole of the Foot, where it inosculates with the Plantar Arch.

#### POSTERIOR TIBIAL ARTERY.

This is the other branch of the Popliteal. It descends above the Tibialis Posticus and under the Soleus to the lower part of the Tibia, bending behind the Inner Angle to the Sole of the

Foot, and dividing under the Lancinated Ligament into the external and internal Plantar Arteries. Its principal branches are,

1. The NUTRIENT ARTERY of the Tibia which distributes *muscular branches* before it perforates the canal of the bone.

2. The FIBULAR OR PERONEAL ARTERY which arises about the commencement of the Tibialis Posticus, and descends between that muscle and the Flexor Longus which afterwards covers it, and it then rests upon the Interosseous Membrane. It gives off the *Anterior* and *Posterior Fibular*, the first to the fore-part, the other to the back part of the Foot.

3. The EXTERNAL PLANTAR which runs between the Massa Carnea Sylvii and the Flexor Brevis Digitorum, passes to the External side of the sole of the Foot, and then bends toward the great toe forming the *Plantar Arch*, and uniting with the deep branch of the anterior Tibial.

4. The INTERNAL PLANTAR ARTERY which separates from the other under the Lancinated Ligament, and passes between the beginning of the Adductor Pollicis and the Tendon of the Tibialis Posticus to inosculate with the anterior Tibial and the External Plantar, and, by forming the *Plantar Arch*, to give off branches to the Toes.

## ANGIOLOGY.

### OF THE PULMONARY ARTERY.

The PULMONARY ARTERY arises, by a white ring, named *Circulus* or *Tendo Arteriosus*, from the right Ventricle of the Heart, and conducts the Venous Blood to the Lungs. It divides into a *Right* and *Left branch*. The RIGHT one which passes under the Curvature of the Aorta and is consequently longest, being distributed to the right Lung, and the LEFT artery passing to the left Lung. Both of them ramify beautifully within the Lungs and form the *Rete Mirabile of Malpighi* upon the *Vesiculæ Bronchiales*.

## ANGIOLOGY.

### OF THE VEINS.

The Veins are *Membranous Canals*, and being a continuation of the arteries arising from their Capillary extremities, terminate by *Six Great Trunks* in the Heart. These Trunks are the VENA CAVA SUPERIOR, the VENA CAVA INFERIOR, and the FOUR PULMONARY VEINS. The only exception to this arrangement is the VENA PORTE which terminates in the Liver.

#### THEIR STRUCTURE.

The Veins, like the Arteries, are composed of *Three Tunics*, but these are much more smooth and delicate. They have no Pulsation, and, when cut across, they collapse so as to appear like a mere fissure. Their diameter is much greater than that of their corresponding arteries; their branches and Trunks are likewise more numerous; and their arrangement is more reticular. The Veins moreover frequently run very superficially, passing a long way immediately under the skin.

#### VALVES of Veins.

VALVES are very numerous in the greater Veins, and are formed by duplicatures of the Internal Membrane of the vessels, which stretch out in a crescent-like form, with their convexities turned to the Heart. Valves are also numerous in all the Subcutaneous Veins of the extremities, of the Neck, of the Penis, &c. None of them exist in the Veins of the Viscera or Brain.

## ANGIOLOGY.

### BRANCHES OF THE VENA CAVA SUPERIOR.

These are derived from three different portions of the body, viz. the *Head and Neck*, the *Upper Extremities*, and the *Thorax*. We shall therefore consider them in that order.

#### VEINS OF THE HEAD AND NECK.

These all terminate in two great Trunks, viz. the *External and Internal Jugular* and the *Vertebral Veins*.

##### EXTERNAL JUGULAR VEIN.

This is formed by

1. The *FRONTAL VEIN* from the Forehead,
2. The *ANGULAR VEIN* from the Inner Angle of the Eye,
3. The *TEMPORAL VEIN* from the Temple,
4. The *AURICULAR VEIN* from the Ear,
5. The *LINGUAL VEIN* from the TONGUE,
6. The *OCCIPITAL VEIN* from the Occiput, and
7. The *MUSCULAR OR SUPER-HUMERAL VEIN* from the Scapula.

Having received these branches, and several others of less importance, it generally terminates in the subclavian of the same side, but sometimes in the axillary and sometimes in the union of these two. Frequently the *Right External Jugular Vein* ends in one way and the *Left* in another.



## INTERNAL JUGULAR VEIN.

This is formed by the Sinuses of the Brain which are derived from its Veins. These Sinuses are,

1. The CAVERNOUS SINUS, situated on each side of the Sella Turcica, and deriving its blood from the great Ophthalmic Veins.
2. The CIRCULAR SINUS which surrounds the Pituitary Gland.
3. The SUPERIOR PETROSAL SINUSES, situated in the Groove of the Ridge of each Os Petrosum, derived from the two former and ending in the termination of the Lateral.
4. The INFERIOR PETROSAL SINUS, situated below the last, derived from the same source, and terminating about the middle of the lateral.
5. The OCCIPITAL SINUS passing up the inferior portion of the Internal Crucial Spine of the Os Occipitis, deriving its blood from the Cerebellum, and ending at the commencement of the Lateral.
6. The INFERIOR LONGITUDINAL SINUS, situated on the lower edge of the Falx, and ending in
7. The TORCULAR HEROPHILI which is placed in the junction of the Falx and Tentorium, deriving its blood from the Inferior Longitudinal and from the Vena Magna Galeni and ending at the beginning of the lateral.
8. The SUPERIOR LONGITUDINAL which passes along the furrow of the spine of the Os Frontis, the groove formed in the upper edges of the Parietal Bones, and that formed in the upper portion of the internal crucial ridge of the Os Occipitis, and terminates at the middle of that ridge in
9. The LATERAL SINUSES which pass in the Grooves of the lateral portions of the crucial ridge of the occiput, in those formed on the inside of the posterior inferior angle of the

Parietal Bones, in those on the inside of the mastoid portions of the Temporal Bones, and in those which are situated on each side the Foramen Magnum of the Occipital Bone.

Passing through the Foramina common to the Occipital and Temporal Bones, these Lateral Sinuses, having received almost all the Blood of the cerebrum and cerebellum, assume the name of the Internal Jugular Veins which now pass down the sides of the Cervical Vertebrae by the edges of the Longi Colli, and behind the Sterno- and Omo-Hyoidei to terminate in the Subclavian Vein.

#### VERTEBRAL VEIN.

This Vein consists sometimes of one, sometimes of several Trunks, and accompanies the Vertebral Artery in its course from the Head through the Foramina of the Transverse processes of the Cervical Vertebrae. It terminates in the upper posterior part of the subclavian, having first communicated with the Occipital Sinus and the Occipital Veins, and various lesser ones.

## ANGIOLOGY.

### VEINS OF THE UPPER EXTREMITIES.

The Trunk of these Vessels is

#### THE AXILLARY VEIN.

This Vessel derives its blood from four great Veins, viz. the *Cephalic*, the *Basilic*, the *Median*, and the *Brachial Vein*.

#### CEPHALIC VEIN.

This vessel runs along the upper part of the fore arm, and receives, at the extremity of the Radius, branches which correspond to the Radial Artery, and also, between the Thumb and Metacarpus, a considerable branch denominated *Cephalica Pollicis*. Ascending it communicates with the Basilica, and assumes the name of *Radialis Externa*. Below the bend of the arm it receives a great branch named *Mediana Cephalica*.

#### BASILIC VEIN.

This vessel is derived from several branches from the back of the Carpus. It runs along the Ulna, toward its outside, between the Muscles and Integuments, where it is called *Cubitalis Externa*. It communicates with the Cephalica, Profunda, and Satellites, and receives the *Vena Mediana Basilica* at the inner Condyle. It then ascends the inside of the arm between the Muscles and Integuments, where it forms numerous communi-

ations, and, having arrived at the top of the Humerus, it terminates in the Axillary.

### MEDIAN VEIN.

This Vein passes up the fore arm between the Cephalic and Basilic Veins, receiving, in its course, the *Vena Profunda*; it then divides into two great branches, viz. the *Mediana Cephalica*, and the *Mediana Basilica*, which, as we have already mentioned, join the Cephalic and Basilic Veins, which ascend over the Tendon of the Biceps, first receiving the *Radialis Interna*. It then ascends between the Deltoid and the Pectoralis Major, receiving in its passage a branch called the *Lesser Cephalic*, and terminates in the Axillary Vein.

### BRACHIAL VEIN.

This Vein receives the blood of the VENÆ SOLDALES of the Radial, Ulnar, and Interosseal Arteries, and terminates in the Axillary.

## ANGIOLOGY.

### VEINS OF THE THORAX.

#### VENÆ PECTORALES INTERNÆ.

The VENÆ PECTORALES INTERNÆ include the *Diaphragmaticæ*, *Pericardiæ*, *Mediastinæ*, *Thymicæ*, *Mammariæ Internæ*, *Tracheales*, &c. which empty themselves into the Subclavian Vein.

#### VENA AYZGOS.

The *Vena Azygos* or *Vena Sine Pari* communicates at the back of the Diaphragm, sometimes with the Renal Veins, and sometimes with the Lumbar. It then passes from the left side of the Thorax over the Spine, and ascends before the Intercostal Arteries on the right side of the Dorsal Vertebræ, receiving all the blood of the *Intercostal Veins*. At the Superior part of the Thorax it turns above the origin of the right Lung, and surrounds the right Pulmonary Vessels. The vein then opens posteriorly into the upper part of the superior Vena Cava.

#### SUBCLAVIAN VEINS.

The RIGHT SUBCLAVIAN VEIN is shorter than the left, and receives four great branches, viz. the *External Jugular*, the *Internal Jugular*, the *Vertebral* and the *Axillary Vein*; of which last it is properly the continuation.

The LEFT SUBCLAVIAN is *longer than the right*, on account of the situation of the Superior Vena Cava toward the right side. It not only receives four branches corresponding to those above enumerated, but also the *Superior Intercostal Vein* and the *Termination of the Thoracic Duct*.

The SUBCLAVIAN VEINS unite behind the Cartilage of the first left Rib, forming the SUPERIOR VENA CAVA, which, as it enters the RIGHT AURICLE, is placed to the right of and somewhat before the Aorta.

## ANGIOLOGY.

### BRANCHES OF THE VENA PORTÆ.

This Vessel is composed of three considerable Veins, viz. the *Vena Meseraica Major*, the *Vena Splenica*, and the *Vena Meseraica Minor* or *Hæmorrhoidalis Interna*.

#### VENA MESERAICA MAJOR.

This Vein returns almost all the Blood of the *Superior Mesenteric Artery*, and forms what has been denominated the *Inferior Vena Portæ*.

#### SPLENIC VEIN.

This Vessel takes the course of the *Splenic Artery*, and receives the *Coronary Vein of the Stomach*, the *Pancreatic Veins*, the *Gastro-Epiploica Sinistra*, and the *Gastro-Epiploica Dextra*. It generally also receives the

#### VENA MESERAICA MINOR, OR HÆMORRHOIDALIS INTERNA.

This Vein returns the *Blood* of the *Inferior Mesenteric*, and *Cœliac Arteries*. It generally terminates in the *Splenic Vein*, but sometimes in the *Trunk* of the *Vena Portæ*.



## VENA PORTÆ.

The Trunk of this Vessel receives the *Vena Cysticæ* from the Gall Bladder, the *Less Hepatic Vein*, the *Ploric Vein*, the *Duodenal Vein*, and sometimes the *Right Gastric* and the *Coronary of the Stomach*. Thus formed, the Trunk of the Vena Portæ is situated under the Liver, whence it passes slightly to the right behind the Hepatic Artery. This portion of it is termed VENA PORTÆ VENTRALIS, while that portion of it which ramifies in the Liver is termed VENA PORTÆ HEPATICA.

## ANGIOLOGY.

### BRANCHES OF THE VENA CAVA INFERIOR.

These are derived from three sources, viz. the *Pelvis*, *Loins*, and *Lower extremities*.

### VEINS OF THE PELVIS AND LOINS.

#### INTERNAL ILIAC VEIN.

The INTERNAL ILIAC OR HYPOGASTRIC VEIN ascends from the Pelvis, behind the internal Iliac Artery, and receives, in its course, the *External Hemorrhoidal Veins* from the Arms, the *Internal Pudic Veins* from the parts of generation, the *Thyroid Vein* through the notch of the Obturator Foramen, and numerous other less important vessels.

#### EXTERNAL ILIAC VEIN.

This is the continuation of the Crural Vein afterwards to be described. Having passed under Poupart's Ligament, it receives the name of External Iliac, and is joined by the *Epigastric Vein*.

#### COMMON ILIAC VEIN.

This Vessel is derived from the two former which join some-

what lower than the two arteries of the same name. The *External Iliac Veins* are placed on the inside of the arteries and the *Internal Iliac Veins* behind their arteries. The COMMON ILIAC VEINS unite to form the VENA CAVA INFERIOR, and receive, at their junction, the *Vena Sacra-Media*.

### LUMBAR VEINS.

These Vessels correspond to the arteries of the same name, and join the Vena Cava as it ascends upon the front of the Lumbar Vertebrae.

### RENAL VEINS.

These join the Vena Cava still higher up. The RIGHT RENAL VEIN, on account of the inferior situation of the Right Kidney, has to make an ascent, and the LEFT VEIN which is *longest* passes over the Trunk of the Aorta, just above the superior mesenteric artery.

Having received all these branches, and also the *Phrenic Hepatic*, (and, in the Fœtus, the *Ductus Venosus*,) the Inferior Cava ascends through the Tendinous part of the Diaphragm into the Pericardium terminating in the RIGHT AURICLE.

## ANGIOLOGY.

### VEINS OF THE LOWER EXTREMITIES.

The GREAT SUPERFICIAL VEINS of the Lower Extremities are the *Vena Saphena Major* and the *Vena Saphena Minor*; its DEEP SEATED VEINS are the *Popliteal*, the *Crural*, &c.

#### VENA SAPHENA MAJOR.

This Vessel commences about the great Toe and ascends between the two first Metatarsal Bones, where it receives a *Transverse Arch* from over the Metatarsus. In its course upward, it receives *Two Branches* under the Inner Ankle and several others as it ascends over the inside of the Knee and Thigh. In the groin it also receives numerous *Inguinal Branches* and terminates in the top of the Crural Vein.

#### VENA SAPHENA MINOR.

This Vein arises from the outside of the Foot, passing up the outside of the Tendo Achillis and afterwards of the Gastrocnemius. It then receives several branches, and, entering the Ham, some others, soon after it terminates in the upper part of the

## POPLITEAL VEIN.

This Vessel is formed by the *Anterior Tibial*, the *Posterior Tibial*, and the *Peroneal Veins* which accompany their respective arteries. It commences below the Popliteal Muscle, and, having passed above the Ham, it acquires the name of

## CRURAL VEIN.

This Vessel ascends the Thigh behind the Femoral Artery, but opposite the Trochanter Major, it crosses to the inside of the artery, and, when it has passed below Poupart's Ligament, receives the name of External Iliac. Below that Ligament, it receives the *External Pudic Veins* and the *Vena Saphena Major*.

## ANGIOLOGY.

### OF THE ABSORBENTS.

The Absorbent Vessels are *Delicate Transparent Tubes* which carry the *Lymph* and *Chyle* from the Internal Cavities or External surfaces of the body toward the Heart.

#### STRUCTURE.

They are composed of thin but strong *Tunics*.

#### DIVISION.


The Absorbent System consists of *Lacteal Vessels*, *Lymphatic Vessels*, *Conglobate Glands* and the *Thoracic Duct*.

#### LACTEAL VESSELS.

The LACTEALS absorb Chyle from the Intestinal Canal. They are more numerous in the small than in the great Intestines, and in the Ilium, than in the Jejunum. Ascending from the Intestines, they are enveloped in the layers of the Mesentery and Mesocolon, where they pass through the Conglobate or Mesenteric Glands. By means of these Glands, the Lacteal System is divided into two portions, viz. the Vessels between the Intestines and the Glands, called *Lactea Primi Generis* and between the Glands and the Thoracic Duct termed *Lactea Secundi Generis*.

## LYMPHATIC VESSELS.

These may be divided into *Lymphatics of the Head and Neck, of the Upper Extremities, of the Lower Extremities, and of the Trunk.*



## LYMPHATICS OF THE HEAD AND NECK.

The Lymphatics of the Head and Neck consist of a *Superficial* and a *Deep Seated Set*.

## LYMPHATICS OF THE HEAD AND NECK.

These Vessels naturally arrange themselves into three classes, viz. ANTERIOR, LATERAL and POSTERIOR.

1. The FACIAL LYMPHATICS accompany the Trunk and branches of the Facial artery. Arising from about the Inner Angle of the Eye, the Nose, the Lips, and the Cheek, they pass through Conglobate Glands on the outside of the Buccinator, about the Parotid, beneath the lower Jaw, or behind its angle; while those from about the Tongue, pass through Glands in the neighbourhood of the Os Hyoides.

2. The TEMPORAL LYMPHATICS accompany the Temporal artery through Glands situated at the base of the Zygomatic Process.

3. The OCCIPITAL LYMPHATICS pass through Glands placed behind the Mastoid process.



These Lymphatics accompany the External, but chiefly the Internal Jugular Veins, along which they form numerous Anastomoses and pass through many Glands situated throughout the whole length of the Neck; at the lower part of which they join the Lymphatics of the Upper Extremities.

The THYROIDEAL LYMPHATICS from the Thyroid Gland, are very numerous and may be inflated from its cells. They descend on each side the Trachea, partly terminating in the branch which opens between the right Subclavian and Jugular Veins, and partly in the Thoracic Duct, near its end.

Although we cannot doubt the existence of Lymphatics in the Brain, yet they have never been clearly demonstrated there.

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## LYMPHATICS OF THE UPPER EXTREMITIES.

The Lymphatics of the Upper Extremities also consist of a *Superficial* and a *Deep-seated Set*.

### SUPERFICIAL LYMPHATICS OF THE UPPER EXTREMITIES.

These vessels arise chiefly from the anterior part of the fingers and hand; immediately above the Carpal Ligament they receive others from the Internal and External sides of the hand; and still a little further up numerous twigs from the posterior part of the fingers.

Upon the anterior part of the fore arm these Vessels form an elegant Plexus. They then ascend above the Internal Condyle of the Humerus over the Brachial Artery, and pass through several glands in the course of the Basilic Vein.

Another series of them accompanies the Cephalic Vein, and passes between the Pectoralis Major and the Deltoid to glands situated internal to the Clavicle.

### DEEP-SEATED LYMPHATICS OF THE UPPER EXTREMITIES.

Two of these vessels accompany each of the Arteries of the Arm, and pass through the Axillary Glands, being previously joined by branches from the side of the Trunk.

### AXILLARY TRUNK.

From the Glands of the Axilla great branches run under the Clavicle and form there a considerable Trunk. The Trunk of the right side terminates in the Angle between the Jugular and Subclavian Veins. The Trunk of the left side joins the Thoracic Duct along with the Thyroideal Lymphatics and those of the left side of the Head and Neck.

## LYMPHATICS OF THE LOWER EXTREMITIES.

The Lymphatics of the Lower Extremities consist also of a *Superficial* and a *Deep-seated Set*.

### SUPERFICIAL LYMPHATICS OF THE LOWER EXTREMITIES.

The greater number of these Vessels accompany the Vena Saphena Major. Arising from the toes they pass over the upper part of the foot along with the above-mentioned vessel to the inner ancle, and the inner side of the knee, where they are joined by several ascending the posterior part of the leg from the sole of the foot. Another class of vessels from the outer side of the foot ascend over the Malleolus Externus, but soon separate into two sets; one of them passing anteriorly to join the Lymphatics on the inside of the knee, while the other ascends to the Popliteal Glands with the Vena Saphena Minor. Numerous Trunks then ascend from the inside of the knee over the inner and anterior part of the thigh, and, having received several branches from the posterior and external parts of the thigh, pass through the glands of the groin.

### DEEP-SEATED LYMPHATICS OF THE LOWER EXTREMITIES.

These, ascending from the muscles, accompany the various arteries, pass through the Canal of the Triceps with the Femoral Vessels, and proceed through the Inguinal Glands.

## LYMPHATICS OF THE TRUNK.

These are derived either from the *Pelvis*, the *Abdomen*, or the *Thorax*.

### LYMPHATICS OF THE PELVIS.

From the Prepuce of the Penis three vessels generally arise, unite upon its upper part, and again separate to the right and left Inguinal Glands.—Other Lymphatics from the more internal parts of the Penis pass below the Ossa Pubis.—Those from the Testes and Scrotum pass along the Spermatic Cord, above the Inguinal Glands, to terminate in the Lumbar ones. The more superficial vessels, however, after joining the Femoral Glands, pass under Poupart's Ligament into the cavity of the Abdomen, where many of them penetrate glands within the Ligament, and are joined by others from the Pelvis.

The Lymphatics from the cavity of the Pelvis either pass as we have just now described, or proceed to the internal Iliac Artery, where they are joined by those from the Bladder, Prostate, and Vesiculae Seminales in males, and from the Uterus in females. From this organ, another set accompanies the Hypogastric Vessels, and a third the Spermatics.

The Lymphatic Vessels of the external parts of generation in the female ascend precisely in the same way as those of the male, passing partly through the Abdominal Ring to the Lumbar Glands, partly through the Inguinal Glands, and partly beneath the Ossa Pubis.

A third set of Pelvic Vessels ascend upon the Psoas Magnus.

Having reached the posterior part of the Pelvis, these vessels partly pass over the Os Sacrum, and collect toward the

right side, or they pass from the left to the right under the Aorta, and form a Plexus in the right Lumbar Region, and, at last, arriving at the third Lumbar Vertebra, they all unite, and, being a little further up joined by the Lacteals from the Alimentary Canal, they form the *Receptaculum Chyli*.

### LYMPHATICS OF THE ABDOMEN.

From the Kidney proceed the Renal Plexus of Lymphatic Vessels, which is also joined by those of the Renal Gland, and terminates in a considerable vessel near the Aorta.

From the Spleen, numerous vessels pass, more especially from its internal part, in the course of the Splenic Artery.

From the Pancreas Lymphatic Vessels arise to join those of the Spleen as they pass in its sinuosity.

From the Stomach, one set of Vessels belonging to its lesser Curvature ascend with the Coronary Artery, and another set from its great Curvature join either those of the Spleen on the left side, or ascend by the Pylorus on the right, where they meet the former ones. Near the lesser Curvature of the Duodenum, they also receive the deep-seated vessels of the Liver and those of the Gall Bladder and Spleen; some of them joining the Thoracic Duct together with the Lacteals.

From the Liver numerous vessels arise; the superficial ones of its convex surface passing chiefly to its broad superior Ligament, and thence through the Diaphragm to glands situated before the Pericardium. Its deep-seated vessels have already been mentioned. Those from its inferior surface join the deep-seated vessels about the Portæ, passing to glands near the Vena Portæ, and, near the origin of the superior Mesenteric Artery, terminate in the Thoracic Duct; while the other deep-seated vessels, those from its convex surface, the Lymphatics of the Stomach, of the Spleen, and of the Pancreas, form a large

Trunk, which ascends behind the Sternum, and opens into the Thoracic Duct near its termination.

## LYMPHATICS OF THE THORAX.

From the lungs numerous Lymphatic Vessels arise. The superficial ones form an elegant Plexus upon its surface, and pass toward the root of the lungs to the Bronchial Glands, where the deep-seated vessels, ascending the Bronchia and the branches of the Pulmonary Artery and Vein, join them.

A portion of the Lymphatics of both Lungs leaving the Glands join the Thoracic Duct behind the division of the Trachea; while a portion of those from the right Lung form a Trunk which ascends before the superior Cava, and terminates in the great Lymphatic Vessel which opens between the Subclavian and Jugular Veins of the right side, and a part of the absorbents of the left Lung pass through glands placed behind the arch of the Aorta, in which also those of the Heart terminate, and open into the Thoracic Duct near its termination.

From the Heart there are also numerous vessels accompanying in their course the Coronary Arteries and Veins; those of the left side being the largest, and their Trunk passing to the glands behind the arch of the Aorta, and terminating with those of the Lungs in the upper end of the Thoracic Duct, while those of the right side terminate between the right Subclavian and Jugular Veins.



## ANGIOLOGY.

### OF THE LACTEAL SAC AND THORACIC DUCT.

The LACTEAL SAC is an irregularly oval membranous bag, situated on the body of the first Lumbar Vertebra, behind the right Crus of the Diaphragm, and above the right Renal Artery. It diminishes toward its upper part, being about an inch in length, and a third of an inch in breadth, and terminates in the Thoracic Duct.

This DUCT passes between the Crura of the Diaphragm, and beneath the right side of the Aorta, and ascends between that vessel and the Vena Azygos to the fifth Dorsal Vertebra, where that Vein, in its passage to join the Cava, covers it. The Duct then passes behind the Œsophagus and the Curvature of the Aorta to the left side, till, behind the left Carotid Artery, and on that side of the Œsophagus, it ascends to the first or second Dorsal Vertebra, and, leaving the Carotid, makes a circular turn and divides. Uniting again almost immediately, it descends behind the internal Jugular Vein, to the left of which it enters the upper part of the Subclavian Vein, which forms at its entrance a *Semilunar Valve*, covering the greater part of the orifice of the Duct.

### LYMPHATIC GLANDS.

In the Trunk the most remarkable of these glands are those which, from a hundred and fifty to two hundred in number,



cover the surface of the Mesentery. They are likewise placed, but less numerously, upon the Mesocolon, near the Coronary Artery of the Stomach, upon the Omentum and the Lesser Pancreas, and these belong to the Intestinal Canal. But there are many others in the Pelvis, Abdomen, and Thorax.

In the Pelvis they are to be found external to the Iliac Artery, about the Internal Iliac Artery, and upon the Os Sacrum.

In the Abdomen they may be seen about the Lumbar Vertebrae, the vessels of the Spleen, Liver, and Kidneys.

In the Thorax they are situated upon the Pericardium, the upper surface of the Diaphragm, and between the layers of the Mediastinum. The Bronchial are at the root of the Lungs, and there are also some about the Thoracic Duct.

The chief Lymphatic Glands of the extremities are those of the Groins and Axillæ.

## OF THE ORGANS OF SENSE.

### OF THE EYE.

The Eye or organ of vision is situated in the orbits of the head, and may, with its appendages, be considered under several heads, namely, the *Bony Orbits*, the *External Parts* of the Eye, the *Ball* of the Eye, the *Nerves* of the Eye, the *Muscles* and *Vessels* of the Eye.

#### ORBITS.

Seven bones contribute to the formation of each orbit, viz. the *Os Frontis*, the *Os Sphenoides*, *Os Ethmoides*, *Os Maxillare*, *Os Mala*, *Os Lacrymale* and *Os Palati*.

The *Os Frontis*, *Os Maxillare*, and *Os Mala*, form the edge of the orbit; the *Os Sphenoides* and *Os Palati* form its bottom; and all of these bones, except the *Os Palati*, contribute to the formation of its sides. The *Foramen Opticum* is placed in the bottom of the orbit, the *Sphenoidal Fissure* is situated at the upper part of its external side, and the *Spheno-Maxillary Fissure* is placed at the lower part of the same side.

A membrane named *Periorbita* lines the cavity of the orbits; it is derived from the *dura mater*, and passes through the foramina to the orbit. It also joins the periosteum of the face at the edge of the orbits.

The form of the orbits considerably resembles two funnels, the nearest sides of which are parallel, and, in this way, their external edges are at a much greater distance from the nose

than any other part of them; they are also turned backward much more than their internal edges.

### EXTERNAL PARTS OF THE EYE.

These consist of the *Supercilia*, *Palpebræ*, *Tarsi*, *Cilia*, *Glandula Ciliares*, *Glandula Lachrymalis*, *Caruncula Lachrymalis*, *Lacus Lachrymalis*, *Plica Lachrymalis*, *Puncta Lachrymalia*, *Canaliculi Lachrymales*, *Saccus Lachrymalis*, and the *Ductus Lachrymalis*.

#### SUPERCILIA.

The SUPERCILIA, OR EYEBROWS, are arches of hair which arise internally and cross each other as they pass outward. They are placed in the common integuments over an increased quantity of cellular substance, upon the superciliary ridges of the frontal bone.

Each of them possesses a muscle named *Corrugator Supercilii*, which has already been described.

Their use is to defend the Eye from too great a quantity of light, to prevent the sweat passing down upon it from the forehead, and to express various passions by the movements of the muscles connected with it.

#### PALPEBRÆ.

Of these each Eye possesses two, a SUPERIOR and INFERIOR, the superior being the largest, the inferior the smallest. They consist of a Cartilage, afterwards to be described, of muscles and of common integuments. They are placed above and below the anterior part of the globe of the Eye, and unite at their extremities to form the external, or small, and the internal, or larger, angle or canthus of the Eyelids.

Internally they are lined by the *Tunica Conjunctiva*, and

contain the Meibomian Glands. The Cilia are placed on their edges, and the Tarsi within them.

Their USE is by covering the Eyes to permit sleep, to defend them from too strong a light, or from extraneous bodies, and to lubricate the surface of the Eye.

#### TARSI.

The TARSI are cartilaginous bodies situated on the edge of each Eyelid. They are broader at the middle than at their extremities, and considerably more so at their nasal than at their temporal end. The superior Tarsus is broader than the inferior, and is rounded at its upper edge. The internal side of both is grooved by transverse channels for the reception of the Ciliary or Meibomian Glands, and, when shut, the Tarsi are so formed that their external edges alone touch each other, and leave internally a groove by which the Tears pass to the Puncta Lachrymalia.

These Tarsi are connected by Ligaments to the Orbits, where they are produced from the Periosteum of the Orbit and the Pericranium joining each other and forming a production. They are termed *Ligamenta Tarsorum Lata*. The upper one is broadest and is attached to the upper edge of the superior Tarsus, and the inferior is fixed to the lower edge of the inferior Tarsus.

The USE of these Cartilages is to give strength to, and preserve the form of the Eyelids, and to lodge, without the possibility of compression, the Meibomian Glands.

#### CILIA.

The CILIA or EYELASHES are rows of Hairs situated on the edges of the Eyelids, and wanting only at the internal Canthus. Those of the inferior Eyelids are shorter than those of the su-

perior, which bend first downward, then outward, and lastly upward, the inferior running in a contrary direction, so that when the Eyelids are shut, they intersect each other and form' as it were, a canal, of which the inferior Cilia constitute the superior part, and the superior Cilia the inferior part.

Their use is to defend the Eyes from too much light, and from extraneous bodies.

#### CILIARY GLANDS.

The CILIARY OR MEIBOMIAN GLANDS are of a Follicular kind, placed in the transverse grooves of the inner side of the Tarsi, and being twenty or thirty in number to each Eyelid. They are more numerous in the upper than in the under Eyelid, and their ducts open along the inner border of the edges of the Palpebræ.

Their use is to secrete a Mucilaginous Fluid which covers the edges of the Eyelids.

#### LACHRYMAL GLAND.

This GLAND is of the Conglomerate kind, situated in the depression of the upper and outer part of the Orbit. It is of a flat form, and distinctly divided into two considerable lobes, one of which is placed before the other.

The Lachrymal Ducts which arise from it are small, and run parallel to each other. They pass in the Tunica Conjunctiva of the upper Eyelid, near its outer angles, and penetrate it near the upper edge of its Tarsus.

The use of this Gland is to secrete the tears.

#### CARUNCULA LACHRYMALIS.

This also is a small Gland of the Conglomerate kind, situated between the inner angle of the Palpebræ and the ball of the

Eye. Its form is oblong; it is covered by minute hairs and lubricated by the Sebaceous matter which itself secretes.

Its USE is to attract and fix any matter floating on the surface of the Eye.

#### LACUS LACHRYMALIS.

This is nearly a circular depression surrounding the Caruncula Lachrymalis.

Its USE is, by permitting the tears to flow around it, to carry any extraneous body toward the Caruncula.

#### PLICA LUNARIS.

The Plica Lunaris is a membranous duplicature of the Tunica Conjunctiva, situated between the Caruncula Lachrymalis and the ball of the Eye. Its form is crescent-like, having its BODY turned toward the Caruncula, and its HORNS, which are *superior* and *inferior*, directed toward the Puncta Lachrymalia.

It is this duplicature which forms the *Membrana Nictitans* or *third Eyelid* in some Quadrupeds and Birds, and which, in the last of these classes of animals, is furnished with a couple of Muscles by which it is drawn over the Eyeball.

The USE of the Plica Lunaris is supposed to be that of directing the Tears toward the Puncta Lachrymalia,

#### PUNCTA LACHRYMALIA.

The Puncta Lachrymalia are cartilaginous circles lined by a delicate and, perhaps, contractile membrane. They are situated near the inner Canthi of the Palpebræ, in the edge of each Eyelid, at the extremities of the Tarsi, upon small eminences obliquely opposite to each other, so that their outer edges alone touch each other when the Eyelids are shut.



The use of these Puncta is, by capillary attraction, to absorb the tears.

#### CANALICULI LACHRYMALES.

The CANALICULI LACHRYMALES are membranous canals situated between the Puncta Lachrymalia and the Lachrymal Sac on the side of the Nose. The *superior* ascends, and the *inferior* descends, for a short way; then both assume the opposite direction, the superior descending and the inferior ascending for a considerable space, running toward each other at one point of the Lachrymal Sac, but opening into it distinctly behind the Tendon of the Orbicularis Palpebrarum.

The use of the Canaliculi Lachrymales is to conduct the Tears from the Puncta Lachrymalia to the Lachrymal Sac.

#### LACHRYMAL SAC.

This is a membranous bag, situated in the groove of the Os Lachrymale and Os Maxillare Superius, on the side of the upper part of the Nose, behind the Tendon of the Orbicularis Palpebrarum, one-fourth of it being placed above and three-fourths below the Tendon. Its form is oblong, and it has three apertures, two of which are at the upper part of its outer side from the Canaliculi Lachrymales, and one at its lower end, which is the commencement of the Lachrymal Duct.

Its use is to receive the tears.

#### LACHRYMAL DUCT.

The LACHRYMAL DUCT is a membranous canal situated beneath the Sac, from the lower part of which it opens, and is inclosed by a bony canal, formed by the Os Maxillare Superius, Os Turbinatum Inferius, and the lower part of the Os La-



chrymalè. It opens into the anterior part of the cavity of the nares beneath the Inferior Turbinated Bone.

### BALL OF THE EYE.

The Ball of the Eye is composed of *Coats* and *Humours*.

#### COATS.

The COATS of the Eye are *Six* in number, viz. the *Tunica Conjunctiva*, the *Cornea*, the *Iris*, the *Tunica Sclerotica*, *Tunica Choroides*, and *Retina*. All of these Coats are merely partial; but the *Sclerotica*, *Choroides*, and *Retina*, are less so than the three first.

#### TUNICA CONJUNCTIVA.

The TUNICA CONJUNCTIVA is a vascular but transparent membrane, reflected from the Eyelids over the anterior part of the ball of the Eye, and therefore properly divided into two portions, namely, the *Conjunctiva Palpebrarum* and the *Conjunctiva Oculi*. It is more firmly attached to the Eye than to the Eyelids, and it is most firmly fixed over the Cornea.

The USE of the Tunica Conjunctiva is to protect and to lubricate the anterior part of the Eye by the moisture which its Arteries exhale.

#### CORNEA.

The CORNEA is a circular and thick, but very transparent membrane, placed in the anterior central part of the ball of the Eye. It is more convex than the rest of the ball. It is separable from the Sclerotic by maceration, and is also itself visible into Lamellæ.

Its USE is to transmit the rays of light to the Eye, while, by its strength, it contributes to defend it anteriorly.

## IRIS.

The Iris is a broad and flat circular body of membranous and muscular structure. It arises a little behind the edge of the Cornea from the ciliary circle of the Sclerotic Coat and, running across the anterior part of the ball of the Eye, forms an incomplete Septum. Its middle perforation is denominated the PUPIL OF THE EYE, and is occupied in the fœtus by the MEMBRANA PUPILLARIS.

The Iris consists chiefly of two sets of Muscular Fibres, the one external and *radiated* the other internal and *circular*, surrounding the Pupil and forming its Sphincter. It is capable of contraction and expansion so as to enlarge or diminish the Pupil.

The direction of the Iris is somewhat backward and inward; its anterior side assumes a variety of colours, and its posterior side, from the dark brown colour which covers it, has been denominated UVEA.

## SCLEROTIC COAT.

The SCLEROTIC COAT envelopes all the ball of the Eye except the portion anteriorly occupied by the Cornea and posteriorly by the filaments of the Optic Nerve, which there pass through a number of small foramina, and this is denominated the Cribriform part of the Sclerotic Coat.

Its substance is membranous, being composed of fibres interwoven in every direction excessively strong and of a pure white colour, except at its internal posterior part, where it is tinged by the dark pigment of the Choroid Coat. Its form is consequently spherical, and its posterior part is considerably thicker than its anterior one.

Its use is to give strength to and protect the ball of the Eye.

## CHOROID COAT.

The CHOROID COAT is situated immediately within the Sclerotic, commencing at the termination of the optic nerve and terminating at the ciliary circle of the Sclerotic Coat, to which it is firmly attached.

It is an extremely vascular membrane, consisting properly of one layer, which is much thinner than the Sclerotic. Its inner villous surface has been considered a distinct Lamina under the name of *Tunica Ruyschiana*, but there is no such distinction in the human subject.

The Choroid Coat terminates anteriorly in the *Corpus Ciliare*, which forms a circle around its anterior edge. This *Corpus Ciliare* is broader toward the temple than toward the nose, and is composed of the *Ciliary Striæ* or *Plicæ*, the points of which constitute the *Ciliary processes*. The posterior part of the *Corpus Ciliare* is fixed to the Retina behind the edge of the Christalline Lens, and before the Vitreous humour; but the Ciliary processes pass loosely behind the outer margin of the Iris, into the posterior chamber of the aqueous humour.

The colour of the Choroid Coat is dark brown, *Pigmentum Nigrum* covering its internal surface. This *Pigmentum Nigrum* posteriorly tinges the Sclerotic, but is blackest and thickest toward the anterior part of the Eye.

The vessels of the choroid are amazingly numerous; the arteries running parallel upon its internal surface, and the veins vortically upon its external surface. Its nerves, denominated ciliary, are also extremely numerous.

The use of the Choroid Coat is to conduct the vessels of the internal Eye, and, by its dark Pigment, to absorb whatever rays of light permeate the Retina.

## RETINA.

The RETINA is the Expansion of the Optic Nerve. It is placed internal to the Choroid, but external to the Tunica Hyaloidea or Capsule of the Vitreous humour, and adheres to these Coats only at the Corpus Ciliare.

Behind the Corpus Ciliare it is thinner than elsewhere, striated and covered by Pigmentum Nigrum, behind which it adheres to the anterior part of the Capsule of the Vitreous humour. Anteriorly it terminates upon the edge of the Crystalline Capsule.

Precisely in the centre of its posterior part are situated the FORAMEN OF SOEEMERRING, and the YELLOW ZONE surrounding it, the uses of which are at present totally unknown. Besides in man they have been found to exist only in the monkey.

The USE of the Retina is to constitute the immediate organ of vision.

## HUMOURS OF THE EYE.

The HUMOURS of the Eye are three in number, viz. the *Aqueous*, the *Crystalline*, and the *Vitreous*.

## AQUEOUS HUMOUR.

The AQUEOUS HUMOUR is always thin. In the fœtus it is turbid and bloody, but pure and transparent in the adult. It is situated between the Cornea before, and the Crystalline humour behind, and, being divided by the Iris into an anterior and a posterior portion, is said to occupy the *anterior* or *larger* and the *posterior* or *smaller Chambers of the Eye*.

The USE of this humour is at once to transmit the rays of light to the Eye, and to permit the motions of the Iris.

## CHRYSTALLINE HUMOUR.

The CHRYSTALLINE LENS or Humour is externally soft but internally tough, pulpy but transparent, its colour varying according to age. In the fœtus its form is almost spherical but becomes flatter in the adult, and is ultimately less convex before than behind. Internally it consists of concentric Lamellæ, and each of these is composed of Radii.

The TUNIC of the CHRYSTALLINE LENS is thicker than that of the Vitreous humour, but is thinnest at its posterior part. This Tunic is also called *Tunica Aranea* or the *Capsule of the Chrystalline Lens*.

The USE of the Chrystalline Lens is, by its refracting power, to cause the rays of light to converge, and to transmit them to the Vitreous humour.

## VITREOUS HUMOUR.

This humour is a transparent pulpy substance, slightly tinged with red in the fœtus, and occupying all the ball of the Eye behind the cristalline lens. It is concave before for the purpose of receiving the posterior part of the lens, but it is round elsewhere. Internally it is divided into communicating membranous cells filled with fluid.

Its TUNIC called HYALOIDEA or VITREA is extremely thin and transparent, and transmits the Septa internally at the Corpus Ciliare. The Tunica Hyaloidea divides into two layers, sending one behind the Chrystalline, and another before its edge, called the *Ciliary Zone*. It is behind this Zone that the empty *Canal of M. Petit* is situated.

The USE of the Vitreous Humour is to expand the coats of the Eye, to preserve the Lens in its situation, and to direct the rays of light to the Retina.

## NERVES OF THE EYE.

The NERVES OF THE EYE are the *Optic or second pair, the third and fourth pairs, the Ophthalmic or first branch of the fifth pair, the sixth pair, and twigs from the seventh.*

The External Parts of the Eye are supplied by twigs of the Fifth and Seventh pairs.—The Ball of the Eye is supplied by the Ciliary Nerves derived from the Lenticular Ganglion formed by the third and first branch of the fifth pairs.—The Muscles of the Eye, the Lacrymal Gland, &c. are supplied by branches of the Third, Fourth, Fifth, and Sixth pairs.—But of all these nerves, the Optic is the only one which here demands a particular description.

### OPTIC NERVE.

The Optic Nerve, previous to entering the Sclerotic Coat, contracts, then passes through a *Cribriform Portion* of it internal to its axis. Beneath this, the nerve is invested by the commencement of the Choroid Coat, and, previous to its expansion, it forms a small *Bulbous Projection* into the Cavity of the Eye.

In the centre of this nerve it is that the Arteria Centralis Retinæ passes.—See further description of this nerve in the section of Neurology.

## MUSCLES OF THE EYE.

These are explained under the Section of Myology.



## VESSELS OF THE EYE.

The External Parts of the Eye are supplied by the *Facial Temporal* and *Frontal Arteries*.—The *Ophthalmic Artery* which passes through the Foramen Opticum, from the internal Carotid, gives off the *Ciliary Arteries* which pass through the Sclerotic Coat and are distributed to the Choroid and Iris ; it also gives off, to the Retina, the *Arteria Centralis Retinæ* which passes through the optic nerve to be expanded upon that Membrane. This artery also supplies the muscles of the Eye, the Tunica Conjunctiva, Lachrymal Gland, &c.

The Veins of the Eye correspond to the Arteries, the External ones passing to the Jugular Vein and the internal ones to the great Ophthalmic Vein which terminates in the Cavernous Sinus.

## PHYSIOLOGY OF THE EYE.

Rays diverging from a light object fall upon the anterior part of the Eye-ball. Those, however, which fall upon the Cornea or even upon the Iris produce no sense of vision, and it is only those Rays which strike the Pupil that effect this purpose. The Rays which enter the Pupil are more or less numerous in proportion as the Pupil is more or less dilated. Those which proceed from a near object diverge, and, in order to collect them together, the Iris contracts ; those, on the contrary, which proceed from a distant object, converge, and the Pupil expands to include a greater number of them.

The motions of the Iris depend upon the manner in which the Retina is affected by light, and not upon itself ; for, when



Rays of light are directed solely to a point of the Iris, it seems altogether insensible to them. The Proximate cause, therefore, of these motions, depends upon the muscularity of the Iris, for Dr. Monro has clearly demonstrated the muscles of which it consists, and which have already been described, viz. an internal muscle placed in the inner edge of the Iris and constituting the *Sphincter of the Pupil*, equally well seen on its anterior and posterior parts, and forming about one-fifth of the breadth of the Iris; and also a *Radiated Muscle* situated between the outer edge of the Sphincter and the Root of the Iris.

The Rays of light, having passed through the aqueous humour, are strongly refracted by the chrystalline lens, which is effected by its form and density. But, arriving at the vitreous humour, the Rays pass through it, and, owing to its less density, are expanded to the Retina.

It has been generally thought that the Rays of light decussate each other in passing through the Eye, so that the Images of Objects are reversed upon the Retina. This conclusion is by no means clearly established, nor are the reasons assigned for it by Berkeley at all satisfactory.

## ORGANS OF SENSE.

### OF THE EAR.

The EAR is divided into *External* and *Internal*; its external parts consisting of three portions, viz. the *Lobulus*, *Pinna*, and *Meatus Externus*; its internal parts consisting of the *Tympanum*, *Labyrinth* (which is again subdivided), and *Meatus Internus*.

### EXTERNAL EAR.

#### LOBULUS.

The LOBULUS derives its name from its form. It is the most inferior and depending part of the external Ear. It is constructed merely of Adipose substance and common Integuments, containing numerous Sebaceous Glands.

#### PINNA.

The PINNA is the superior part of the External Ear, and is composed of Cartilage, Cellular Substance, Common Integuments, and Sebaceous Glands. The irregularity of the form of its Cartilage gives to it several eminences and depressions.

Its EMINENCES are four in number. 1. The HELIX which winds round the posterior and superior edge of the External Ear and anteriorly terminates by sending in a continuation of itself through the middle of the Choncha or great cavity of the External Ear, by which that cavity is divided. 2. The

**ANTIHELIX**, which is situated before or within the former, and superiorly divides into two processes, which are termed its **CRURA**. 3. The **TRAGUS** which is a small eminence covered by hairs and projecting over the anterior part of the **Meatus Auditorius Externus** near the lower anterior part of the **Helix**.

4. The **ANTITRAGUS** which is an eminence placed opposite and behind the **Tragus**, above the **Lobulus**, and below the inferior end of the **antihelix**.

Its **DEPRESSIONS** are three in number: 1. The **FOSSA INNO-MINATA**, which is situated between the **Helix** and the **Anti-helix**. 2. The **FOSSA NAVICULARIS** or **SCAPHA** placed between the **Crura** of the **Antihelix** and the anterior part of the **helix**. 3. The **CHONCHA**, which is the large cavity within the **Anti-helix** divided in the middle by a production of the **Helix**, and having at its lower anterior part the commencement of the **Meatus Auditorius Externus**.

There are also several **FISSURES** peculiar to the cartilaginous base of the **Pinna**, viz. One in the anterior part of the **Helix** where it covers the **Concha**, One between the inferior part of the **Antihelix** and **Antitragus**, and Two in the base of the **Tragus**.

The **Pinna** has also several **LIGAMENTS** which are denominated *Superior*, *Anterior*, and *Posterior*, but they are not extremely apparent.

The **MUSCLES**, however, which arising from the **Scull** and inserted into the **Pinna**, corresponding in situation to these **Ligaments**, are extremely evident, and are described under the section of **Myology**. The **Muscles** also which arise from one part of the **Pinna** and are inserted into another are also described there.

*MEATUS AUDITORIUS EXTERNUS.*

The MEATUS AUDITORIUS EXTERNUS runs inward from the lower anterior part of the Pinna. It consists of Bone, Cartilage, Membrane, Common Integuments, Ceruminous Glands, and Hairs.

Its BONY PORTION is considerably longest; it is situated most internally, and becomes narrower as it passes outward to the Membrana Tympani. At the Membrana Tympani it terminates in a circular edge, the upper part of which is inclined outward, and the under part inward, giving a corresponding obliquity to the Membrana Tympani. In the Fœtus this anterior termination of the Meatus is merely a bony ring grooved for the reception of the Membrane.

The CARTILAGINOUS and MEMBRANOUS PORTION is more external and shorter. The membranous part of it fills merely an irregular fissure in the anterior superior part of the cartilage.

Ceruminous Glands are placed immediately without the internal Membrane of the Meatus, and their Ducts open internally on its sides. The Cuticle of the External Ear passes down the Meatus and is expanded over the Membrana Tympani. The direction to the whole canal is upward and in a curved direction forward.

*NERVES OF THE EXTERNAL EAR.*

The NERVES of the External Ear are derived anteriorly from the Portio Dura of the Seventh Pair or Facial nerve, which, passing through the Fallopian Aqueduct, emerges at the Foramen Stylo-Mastoideum, and posteriorly from the First and Second Pairs of Cervical Nerves.

## VESSELS OF THE EXTERNAL EAR.

The ARTERIES are anteriorly derived from the temporal, and posteriorly from the Occipital, or directly from the external carotid.

The VEINS correspond to the arteries and terminate in the Jugular Veins.

## USE OF THE EXTERNAL EAR.

The USE of the External Ear is to transmit the Vibrations of the external air to the internal Ear.

## INTERNAL EAR.

## TYMPANUM.

The TYMPANUM is an irregular circular cavity composed of one Periosteum and Membranes. Its *External Part* is flat, being formed by the MEMBRANA TYMPANI, derived from the cartilage of the Meatus Externus and from the Periosteum of the Tympanum. In the fœtus, the external side of this Membrane is covered by another, which, from its consistence, has been denominated the MEMBRANA MUCOSA.

Into the *Anterior Part* of the Cavity of the Tympanum, the EUSTACHIAN TUBE opens, and from its *Posterior Part* the passage to the MASTOID CELLS proceeds.

The *Posterior Side* of the cavity is formed principally of bone, and has upon it several EMINENCES and DEPRESSIONS, viz. 1. A *Hollow Bony Pyramid* for the Stapideus, placed at its anterior part, immediately below the passage to the Mastoid cells; 2. A *Bony Semicanal* for the Tensor Tympani situated above the opening of the Eustachian Trumpet; 3. The *Close*

*Canal of the Fallopian Aqueduct* running down its posterior part; 4. A *Protuberance* from the external Semi-circular canal placed in the commencement of the passage to the Mastoid cells; 5. A *Promontory* in the middle of this internal side, caused posteriorly by the Vestibulum, and anteriorly by the commencement of the Cochlea; 6. The *Fenestra Rotunda*, connected with the inferior Scala of the Cochlea, situated under the Promontory, and covered by a Membrane from the Periosteum of the Tympanum; 7. The *Fenestra Ovalis* situated immediately above the former, connected with the Vestibulum, similarly covered by a membrane and lodging the base of the Stapes. The whole of this cavity is lined by a very vascular Periosteum.

The Cavity of the Tympanum contains the bones of the internal ear which are four in number, viz. the *Malleus*, the *Incus*, the *Os Orbiculare*, and the *Stapes*.

#### MALLEUS.

This bone is divided into a *Handle*, a *Head*, and a *Long* and *Short Process*.

Its *HANDLE*, with an apex turned outward and forward, is fixed to the *Membrana Tympani*. Its *LONG PROCESS*, becoming broader toward its termination, is turned forward and lies in a transverse groove on the inside of the anterior end of the bony ring, and in the chink of the articular fossa of the temporal bone. Its *SHORT PROCESS* is turned to the upper part of the *Membrana Tympani*. Its *NECK* is immediately above this. Lastly, its *HEAD* has upon it two eminences and a middle depression for articulation with the *Incus*.

The whole bone is internally *hollow*.

#### INCUS.

This bone is divided into a *Body*, a *Long* and a *Short Leg*.



Its BODY is placed superiorly and has upon it a depression for the Malleus. Its SHORT LEG is turned backward to the commencement of the Mastoid Cells. Its LONG LEG, with an Apex curved inward, is turned inward to join the following bone.—This bone also is internally *hollow*.

## OS ORBICULARE.

This is a very small bone, having that side attached to the Incus *concave*, and that which is attached to the following bone *convex*.

## STAPES.

The Stapes is divided into a *Head*, two *Crura*, and a *Base*. Its HEAD is turned outward. Its CRURA are turned anteriorly and posteriorly, the *anterior* one being the shortest and straightest, the *posterior* one being the longest and most curved. Its BASE, which joins the two Crura, has its upper edge semicircular and its lower one straight, and is fixed in the Fenestra Ovalis. Both crura and base are grooved internally for the reception of the Membrane of the Stapes.

The MUSCLES attached to these bones are described under the Section of Myology.

Besides these Bones, Muscles, &c. the cavity of the Tympanum contains only air, which it derives from the Fauces by means of the Eustachian tube.

## LABYRINTH.

The Labyrinth of the internal Ear consists of three portions, viz. the *Vestibulum*, *Semicircular Canals* and *Cochlea*.

## VESTIBULUM.

The VESTIBULUM is somewhat of an oval form, and is situ-



ated immediately within the Fenestra Ovalis. It is remarkable for numerous *Foramina Depressions* and *Elevations*.

Of its *FORAMINA* the first is the *FENESTRA OVALIS* shut only by a Membrane from the Periosteum of the Tympanum: this is situated externally. Anteriorly there is one which opens into the Vestibular or external Scala of the Cochlea, and posteriorly there are six, viz. one which is that of the *AQUEDUCTUS VESTIBULI*, and which internally commences before the common opening of the superior and posterior Semicircular Canals, and externally opens into a small bag between the layers of the Dura Mater on the posterior surface of the Petrous portion of the Temporal bone, about half an inch behind the Meatus Auditorius Externus; the other five openings are those of the Semicircular Canals, one of these openings, already alluded to, being common to two of them.

Its *depressions* are three in number: 1. *CAVITAS SEMIOVALIS*, situated toward its upper part, and perforated by a number of Foramina and thence denominated a *Macula Cribrosa*. 2. The *CAVITAS HEMISPHERICA* placed below the former, and likewise perforated by a *Macula Cribrosa*. 3. The *CAVITAS SULCIFORMIS*, which is merely the commencement of the *Vestibular Aqueduct*.—The third *Macula Cribrosa* is placed in the lower part of the Vestibulum at the commencement of the posterior semicircular Canal. All of these *MACULÆ CRIBROSÆ* transmit branches of the Portio Mollis.

It has merely one *Eminence*, which is situated at its upper part, and is denominated *PYRAMIS OSSEA VESTIBULI*.

The contents of the Vestibulum are Water, Periosteum, a Pulpy Membrane, and the Expansion of the Auditory nerve.

#### SEMICIRCULAR CANALS.

The Semicircular Canals are three in number placed pos-

teriorly to the Vestibulum, formed of bone, and lined by Periosteum. Their names are derived from their situation; one being *Superior* or *Vertical*, another *Posterior* or *Oblique*, and a third *Exterior* or *Horizontal*.

The SUPERIOR SEMICIRCULAR CANAL, the most anterior of the three, is placed Transversely, its convex side constituting the highest part of the Pars Petrosa, and having, more especially in the fœtal state, a considerable cavity underneath it.

The POSTERIOR SEMICIRCULAR CANAL has its convexity turned backward, and lies parallel to the sides of the bone. One of its openings joins that of the Superior Canal, and forms the TUBULUS OSSEUS COMMUNIS of these Canals; its other opening is placed more inferiorly.

The EXTERIOR SEMICIRCULAR CANAL is the least of the three, and is situated most externally; its convexity is turned backward, and its whole situation is nearly horizontal.

Each of these Canals forms nearly three-fourths of a circle, and possesses an enlargement, at one of its ends, denominated an AMPULLA. The *Ampulla* of the Superior Semicircular Canal is placed at its proper opening. The *Ampulla* of the Posterior Canal is situated at its proper opening. The *Ampulla* of the External Canal is placed at its superior aperture.

The whole of them contain Water, a Periosteum, a pulpy Membrane, and the expansion of the Portio Mollis of the Auditory Nerve

#### COCHLEA.

The COCHLEA is a spiral volute of two CYRI or turns and a half: it consists of bone and Periosteum, and is situated toward the anterior part of the Os Petrosus, before the Vestibulum; its base being toward the Meatus Internus, and its Apex outward.

The Cochlea consists of several parts: 1st, the MODIOLUS, which forms a pillar in the middle of the cavity, terminating about the second turn of the Cochlea. It is composed of two plates which are throughout Foraminular, and transmit twigs of the Portio Mollis; 2d, the INFUNDIBULUM, which in shape resembles a funnel; its apex being turned to the apex of the Modiolus, and its base turned to the *Top* or CUPOLA of the Cochlea; 3d, the LAMINA SPIRALIS or *Septum Scalarum*, which winds up the sides of the Modiolus, and divides the Gyri or turns of the Cochlea into two *Scalae*. It does not, however, reach the sides of the Gyri, and therefore but imperfectly divides them; it terminates in a very fine *Hook-like Process*, called HAMULUS LAMINÆ SPIRALIS; 4th, the ZONA MOLLIS COCHLEÆ, which completes the division between the *Scalae*, by proceeding from the edge of the Lamina Spiralis to the sides of the Gyri. Upon it, as well as upon the Lamina Spiralis, the Portio Mollis is expanded.

The *Scalae* of the Cochlea thus divided, are narrower at their terminations than at their beginnings, and are situated the one internal to or behind the other. The internal one, however, passes Externally to the Tympanum by means of the Fenestra Rotunda, while the External one opens Internally into the fore part of the Vestibulum. Both of them begin below, run forward, then upward, and so round, communicating under the Cupola by means of a small foramen called CANALIS SCALARUM COMMUNIS.

The SINUS FENESTRÆ ROTUNDÆ is situated at the commencement of the inferior Scala, and in the bottom of it is the internal opening of the *Aqueductus Cochleæ*, which externally opens immediately below the Meatus Auditorius Internus.

## MEATUS AUDITORIUS INTERNUS, OR CANALIS NERVORUM COMMUNIS.

This is a Canal composed of Bone and Periosteum, passing from within outward, and transmitting the *Portio Mollis*, *Portio Dura*, and an Artery.

The bottom of this Canal is divided by a *SPINE* into a *Superior* or *Less*, and an *Inferior* or *Greater Recess*.—From the *Superior Recess* passes the *Commencement of the Fallopian Aqueduct*, and several small *Foramina*, to the *Cavitas Semiovalis Vestibuli*.—From the *Inferior Recess* proceeds superiorly a *Macula Cribrosa* to the *Cavitas Hemispherica Vestibuli*, and inferiorly, a series of small *Foramina*, arranged in a convoluted manner, and named *Tractus Foraminulosus Cochleæ*, which pass up the sides of the *Modiolus*.—In the posterior side also of the *Meatus Internus*, a small *Foramen* may be seen, which terminates in the *Macula Cribrosa*, at the commencement of the lower end of the *Posterior Semi-circular Canal*.

## NERVES OF THE INTERNAL EAR.

The Nerves of the Internal Ear are the *PORTIO MOLLIS* and *PORTIO DURA* of the Seventh Pair; the former supplying the proper organ of hearing, the latter merely supplying its muscles, &c. Both of them are fully described under the Section of Neurology.

## VESSELS OF THE INTERNAL EAR.

The *ARTERIES* of the Internal Ear are either derived from the Vertebral, and enter the Fallopian Canal and *Tractus Foraminulosus Cochleæ*, or pass from the external Carotid into the *Foramen Stylomastoideum*.

Its *VLINS* terminate in the lateral Sinus.

### PHYSIOLOGY OF THE EAR.

The *USE* of the Internal Ear is to receive the impulse of sound, which is effected in the following manner: The Elastic Tremors or Vibrations of the Air are excited by striking any sonorous substance. These impulsions are transmitted through the atmosphere in straight lines, which are denominated *Rays of Sound*; but they are also transmitted more effectually, and to a greater distance, by more solid bodies. Even water is a better conductor of sound than air, as is verified by the practice of people at sea, who apply their ears near the surface of the water for the purpose of more readily distinguishing faint and distant sounds. The earth transmits the impulses of sound still better, and it is common among the savage and warlike Indian tribes to distinguish the approach of their enemies by applying the ear to the ground. But bodies still more dense transmit sound still better, and seem to our ear even to increase

The conformation of the External Ear, no doubt, contributes to concentrate the rays of sound; yet, in opposition to this, it is but fair to state that persons who have been deprived of the external ear have not perceived any diminution in the capability of perceiving sounds, or, at most, merely a temporary one.

From the external Ear the vibrations of sound pass to the *Concha*, and through the *Meatus Auditorius Externus* to the *Membrana Tympani*, which they cause to vibrate. The *Membrana Tympani*, being rendered tense by means of the *Tensor Tympani*, is calculated to distinguish faint sounds, and, being made loose by the *Laxators* of the *Tympanum*, it is calculated to moderate violent sounds.



The chain of bones placed in the cavity of the Tympanum transmits the vibrations to the Vestibulum, Semicircular Canals and external Scala of the Cochlea. The vibrations of sound must also be transmitted by means of the air contained in the cavity of the Tympanum, which is derived from the Fauces through the Eustachian Tube, and these vibrations must affect the membrane of the Fenestra Rotunda, and the fluid contained in the internal Scala of the Cochlea.

By the Oscillations of the fluid of the Labyrinth, the delicate expansions of the Auditory Nerve upon the zone of the Cochlea, the Alveus Communis, Sacculus Sphericus, and Septum Membranaceum of the Vestibulum, and upon the Ampulle of the Semicircular Canals, must be agitated, and the impression transmitted through the Auditory Nerve to the Sensorium.

Acuteness of sound depends upon the smallness and quickness of the vibrations produced; deepness of sound, on the contrary, depends upon the largeness and slowness of the vibrations.

Of no Organ is the Physiology less understood than that of the Ear. In the Eye, on the contrary, the simple and uniform expansion of the Optic Nerve is readily understood; but the complicated and intricate distribution of the nerve of hearing is, at present, inexplicable. Even the mode of the transmission of sound through the cavity of the Tympanum is not properly understood, and it is taught by some, that unless this cavity contained air, sounds could not be transmitted through it. Practical inferences are even deduced from this unphilosophical opinion, and it is asserted that deafness may be imputable to such deficiency. Now there cannot be a stronger lesson than this of the danger that attends the listening to every one who attempts to reason in Pathological Physiology. Such

persons are totally ignorant of the laws of the transmission of sounds; for the bones of the Tympanum constitute a more effectual mode of transmitting sounds, and, while their vibrations must affect almost the whole of the Labyrinth of the Ear, the vibrations of the air of the Tympanum, and of the membrane of the Fenestra Rotunda, which it can alone affect, can only impress the nerves expanded in one of the Scalæ of the Cochlea.

## OF THE NOSE.

The NOSE, constituting the Organ of Smell, is externally divided into a number of portions, viz.

1. The RADIX or *Root of the Nose*, which is its narrow upper part.
2. Its DORSUM or *Bridge*, which constitutes its middle part, passing downward.
3. Its ALÆ or *Pinnae*, which are its lateral moveable parts.
4. Its COLUMNA, which passes from the tip inward, dividing the *Nostrils*.

The Cartilages of the Nose are also five in number, viz. one in the middle and two on each side.

1. The MIDDLE CARTILAGE, which is the largest, and, being placed in the space left by the Nasal Lamella of the Ethmoid Bone, the Vomer and the Spinous process of the Ossa Maxillaria Superiora, it constitutes the Anterior Cartilaginous portion of the Septum Narium.



2. and 3. The two ANTERIOR LATERAL CARTILAGES, which form, by their union, the *Tip of the Nose*.

4. and 5. The two POSTERIOR LATERAL CARTILAGES, which are convex externally and concave internally, and form the *Alae* or outer edges of the Nostrils, which posteriorly terminate in the Fauces.

Several other Cartilages of less importance, situated between those already described, contribute to the formation of the Nose.

These Cartilages are moved by several muscles, which have been described in the Myological part of this Work.

Various bones also contribute to the formation of the Nose in the following manner.

The Os Frontis, Ossa Nasi, and Ossa Maxillaria Superiora form its superior and anterior external part.

The Os Ethmoides and Ossa Lachrymalia form its superior and lateral internal parts.

The Ossa Maxillaria Superiora, Ossa Turbinata Inferiora, Vomer, Ossa Palati, Os Sphenoides, and Os Ethmoides, form its other internal parts.

The NARES, or *Internal Cavities of the Nose*, are formed inferiorly by the upper surface of the Palatine process of the superior Maxillary bone, which runs forward in a direct line from the Nostrils to the Fauces.—Superiorly they extend to the Cribriform Lamella of the Ethmoid bone—Anteriorly they are enlarged by the arch of the Nasal bones—At their upper posterior part they extend to the body of the Sphenoid bone, and—on each side the Ossa Turbinata Inferiora project into them.

The OPENINGS into the Nares are,—anteriorly two from the Nares—laterally two from the Antra Highmoriana, and other two from the Lachrymal Ducts—at its upper anterior part,

two from the anterior Ethmoid Cells and Frontal Sinuses—at its upper posterior part, two from the posterior Ethmoid Cells—More directly posterior than these, two from the Sphenoid Sinuses, and—at its lower posterior part, the openings into the Fauces.

The whole of this Cavity, and of these Foramina and Sinuses, are lined by a thick spongy membranc, called MEMBRANA MUCOSA OR SCHNEIDERIANA. Upon the surface of this membrane a number of follicles open, which preserve its moisture.

It is upon this membranc, where it covers the superior Turbinated bones and the Septum Narium, that the Olfactory or first pair of nerves are expanded.

The LACHRYMAL SAC AND DUCT, and their connection with the Nose, have already been described.

The DUCTUS INCISIVI remain to be explained. These pass, in a funnel-like form, from the anterior inferior part of the Nares close to the sides of the Septum, but open by one foramen at the fore part of the Palate behind the middle Incisor Teeth. They always transmit a nerve, artery and vein from the Nares to the Palate, and are frequently perforated by small Ducts, which admit a bristle even in the human subject.

### NERVES OF THE NOSE.

The nose is externally supplied with nerves from the Nervus Communicans Faciei or Portio Dura of the seventh pair, and internally it is supplied by twigs of the Ophthalmic and superior Maxillary nerves, and by the branches of the Olfactory.

### VESSELS OF THE NOSE.

The ARTERIES which supply the nose anteriorly are derived from the external and internal Maxillary arteries. Those

which supply its internal part are derived from the internal Maxillary and Ophthalmic arteries.

The VEINS of the nose terminate in the Jugular and great Ophthalmic veins.

### PHYSIOLOGY OF THE NOSE.

The sense of smelling is effected by the suspension of the volatile particles of bodies in the atmosphere, and their application to the Pituitary membrane, where it covers the superior turbinated bones and Septum Narium, and has the Olfactory nerve expanded upon it.



### OF THE MOUTH.

The Mouth constitutes the organ of taste as well as that of mastication, and partly also that of voice. As the organ of mastication, many of its parts have already been described, viz. the *Lips, Cheeks, Gums, Palate, Velum Pendulum Palati, Uvula, Salivary Glands, &c.*

It is therefore now only necessary to describe the particular structure of the *Tongue*, as the more immediate organ of taste.

### TONGUE.

The peculiar medullary and muscular structure of the Tongue is covered superiorly by a production of the Cutis Vera, which there assumes a papillary texture. Above this is expanded the Corpus Mucosum, which, in order to protect the Papillæ, is thicker than in other parts of the body. These

coverings are again enveloped by a fine production of the Epidermis.

The PAPILLÆ of the Tongue are divided into three kinds, viz. the *Maximæ*, *Mediæ* and *Minimæ*.

1. The PAPILLÆ MAXIMÆ LENTICULARES, CAPITATÆ or VAL-LATÆ, are the largest, and are of a lenticular form, having round heads elevated upon short stems. Their situation is in small superficial Fossæ on the base of the Tongue—Each of them is perforated in the middle of their superior part, which is their excretory duct—They are of a glandular nature, and excrete a mucilaginous fluid. These Papillæ are arranged at the posterior part of the Tongue, in such a manner, that the anterior ones project along the middle of the Tongue, and form an angle.

Besides these, numerous mucous follicles cover the whole of the root of the Tongue.

, Behind the angle formed by the anterior of these papillæ, a small *foramen* may be observed, in which other small papillæ open, and throw out a thick saliva; it is called FORAMEN COECUM MORGAGNI.

2nd. The PAPILLÆ MEDIÆ SEMILENTICULARES or FUNGI-FORMES are smaller than the former, only slightly convex and little separate from the surface of the Tongue. They are scattered over the edges, the middle, and anterior parts of the Tongue. By a microscope numerous small Foramina may be observed to open on their superior surface.

3rd. The PAPILLÆ MINIMÆ CONICÆ or VILLOSÆ are more numerous than either of the other classes, but are much smaller. They cover all the upper part of the Tongue, and pass even between the other Papillæ. When examined by a microscope in clear water they appear to have a conical form. As the sense of taste seems principally to reside in these Papillæ, they,

in all probability, consist, in a great measure, of the terminations of nerves.

### NERVES OF THE TONGUE.

The Nerves of the Tongue are supplied by the third branch of the fifth pair or inferior Maxillary, the eighth pair or Par Vagum, and the ninth pair or Lingual Nerves.

The branches of the fifth pair supply the tip and edges of the Tongue, and are, on that account, supposed by some to be the proper nerves of taste.

The branches from the eighth pair supply the base of the Tongue.

The branches derived from the ninth pair seem principally to supply the Muscles about the middle of the Tongue, but communicate with the other two sets.

### VESSELS OF THE TONGUE.

The ARTERIES of the Tongue are derived from the external Carotids, and are named *Dorsal*, *Raninal*, and *Sublingual*. They communicate so very little with the arteries of the opposite side, that the one may be minutely injected without affecting the other.

The VEINS of the Tongue terminate in the external Jugular Veins.

### PHYSIOLOGY OF THE TONGUE.

The Tongue, as we have already said, constitutes the chief organ of taste, although there is also a sensation of taste peculiar to the palate, pharynx, Œsophagus, &c. The sense of taste approaches more nearly to that of touch than any of the others. Indeed it seems to be little more than a modification of it, for in order to produce the sensation of taste actual contact is necessary.

## OF THE SKIN, &amp;c.

The SKIN constitutes the organ of touch, as well as, in some measure, that of absorption, and forms the common Integuments of the body. These Integuments are divided into the *Cuticle*, or *Scarf Skin*, the *Corpus Mucosum*, the *Cutis Vera*, and *Corpus Adiposum*.

## CUTICLE.

The CUTICLE, EPIDERMIS OR SCARF SKIN is a very thin, transparent, insensible, and non-vascular membrane. Externally this membrane is smooth, being only marked by furrows which correspond to those of the *Cutis Vera*, but internally it seems to be formed of an immense number of delicate Laminæ.

It may easily be separated from the other Integuments by a slight degree of putrefaction, or by boiling water; and the *Corpus Mucosum*, which has considerable adhesion to it, is generally elevated with it.

The Cuticle is not throughout of the same thickness, being considerably thicker in the soles of the feet and palms of the hands, even in the fœtus, than elsewhere. This thickness is afterwards increased considerably by pressure.

The whole external surface of the Cuticle is perforated by numerous minute Foramina, which constitute the terminations of Exhalent Vessels, and the commencements of Lymphatics. These perforations are most evident in the palms of the hands, soles of the feet, surface of the nose, conchæ of the ears, &c. It is also perforated by various excretory Ducts, and by the roots of the Hairs.



Considering the Nails as a continuation of the Cuticle, which they in reality are, the Cuticle may be said to cover the whole external surface of the body, and it is also reflected inward to line all the great passages.

The use of the Cuticle is to cover the more sensible parts under it, and to prevent too great a degree of evaporation from the skin.

### CORPUS MUCOSUM.

The CORPUS OF RETE MUCOSUM is situated between the Cuticle and Cutis. It is composed of the capillary extremities of Vessels terminating externally, surrounded by a viscid and mucilaginous fluid. It is thickest in the Negro, who derives from it his black colour, and it is white in the European. It covers every part of the surface of the body excepting beneath the nails, but seems scarcely to exist in the palms or in the soles of the feet, as these are of a light colour even in the Negro.

The origin of the proper Corpus Mucosum has not yet been ascertained, nor are its uses at all understood, for instead of serving the Negro, in whom it is black, as a defence against the heat of the climate, it must undoubtedly absorb an additional quantity of Luminous rays and expose him to an increased heat.

### CUTIS VERA.

The CUTIS VERA OR TRUE SKIN is situated between the Corpus Mucosum and the Corpus Adiposum. It is formed of closely interwoven fibres of various kinds, and contains numerous terminations of vessels and nerves.

The Cutis is elastic, and, when elongated in any direction,



easily recovers itself. Its external surface is firmer and more dense than its internal one. It is thicker on the back than on the anterior part of the body, and most thick and solid in the Palms and Soles. The Blood Vessels of the Cutis are extremely numerous, and to the different quantity of these, in different parts, it owes its variety of colour.

There are a variety of *Folds* on the external surface of the Cutis, and also numerous *Ridges*, which serve to increase its surface.

The Cutis is throughout covered with minute eminences termed PAPILLÆ, which, from their extreme sensibility, are considered as constituting the organ of touch. The Papillæ are of different forms in different parts of the body, where they are also differently arranged. Considerable variety of arrangement may be seen in the palms of the hands. On the lips, from their form, they are denominated *Villi*.

The Cutis Vera becomes extremely thin, and appears almost to terminate at the red part of the Lips, the edges of the Eyelids, and the margin of the Anus.

The USE of this portion of the Skin is to cover and defend the various parts of the body, to give transmission to various fluids, and to constitute the organ of touch by means of its nervous Papillæ.

### CORPUS ADIPOSUM.

The Corpus Adiposum is merely a concrete oleaginous fluid, deposited in small round masses within the cellular membrane, and situated under the Cutis Vera, covering almost the whole surface of the body. It also passes in between the muscles, vessels, &c. and exists, in greater or less quantity, in various other parts; but is wanting also in some parts, as the Eyelids, Penis, &c.

The use of the Corpus Adiposum is to lubricate all the parts of the body, and to serve as a source of nutriment.

### CELLULAR SUBSTANCE OR MEMBRANE.

This is composed of numerous fine and small irregular membranes, forming communicating cells, in which the Corpus Adiposum is secreted. It is thickest where most exposed to pressure, as in the soles of the feet, &c. It possesses, like the Cutis Vera, a great degree of elasticity.

Its use is to contain in many places the globules of the Corpus Adiposum, to invest almost all other parts of the body, and to enter into their composition. It possesses but a small degree of sensibility.

### NAILS.

The NAILS are a continuation of the Cuticle, and are composed of longitudinal fibres, which together constitute different plates.

Like the Cuticle they are Non-Vascular and insensible, and may also be removed in the same way.

They are transparent in reality, though they derive a colour, as well as nourishment, from the Cutis which they cover.

Their roots are of a square form and fixed to a fold of the Cutis Vera a little below the last joint of the fingers and toes.

They derive their origin from these roots, from which they are always produced forward.

The use of the Nails is to defend and strengthen the terminations of the fingers and toes.

## HAIRS.

The Hairs arise by ROOTS or BULBS, which are placed in the cellular substance under the Cutis Vera, and slightly differ in their shape in different parts of the body.

All the bulbs of the hair are covered by *Capsules*, which consist of two layers, and contain an oleaginous fluid.

Like the Nails, the Hair grows only from the root, and each consists of smaller filaments inclosed in a common membrane.

The USE of the Hair is not properly understood.

## SEBACEOUS AND MILIARY GLANDS.

The SEBACEOUS GLANDS are placed immediately under the Cutis Vera, and are most numerous about the ears, nose, &c.

The MILIARY GLANDS are placed in the Axilla, and derive their name from the substance which they excrete, having a resemblance to the Seeds of Millet.

Both species of Glands serve the purpose of excreting matter to lubricate the skin.

## OF THE BRAIN.

The name of Brain is applied to all that Medullary mass which occupies the cavity of the Cranium. As the *Membranes* which envelope the Brain first present themselves, and not only line the inside of the Cranium, but divide the Brain into certain portions, it will be necessary to describe them first.

### MEMBRANES OF THE BRAIN.

The Membranes of the Brain are three in number; namely, an external one named *Dura Mater*, a middle one named *Arachnoidea*, and an internal one called *Pia Mater*. The last are supposed to be more properly the layers of one membrane.

### DURA MATER.

#### ITS SITUATION.

The DURA MATER is situated immediately within the Bones of the Cranium, lining their internal surface, and constituting them a sort of internal Periosteum. It envelopes the brain and all its appendages.

#### STRUCTURE.

The Dura Mater is the strongest membrane of the body, it consists of one layer, although by Maceration it is separated into more. Its texture seems partly Ligamentous and

partly tendinous, and is excessively close, running in various directions. Its colour is white and shining.

#### ADHESIONS.

The Dura Mater, as we have already remarked, adheres firmly to the inside of the Cranium; but, though in contact with the brain, it only adheres to it where its Veins terminate in the sinuses. Its internal surface is lubricated by a fluid exhaled by its vessels.

#### FOLDS OR SEPTA.

The Dura Mater forms several folds which divide the Brain into certain portions. These folds are denominated superior or the *Falx Cerebri*, middle or the *Tentorium*, and inferior or the *Falx Cerebelli*.

#### FALX CEREBRI.

The FALX OF SEPTUM CEREBRI, or *Superior Longitudinal Process of the Dura Mater*, is a long and broad duplicature of that membrane extending from before the Crista Galli along the middle of the Os Frontis, Ossa Parietalia, and part of the Os Occipitis, about the middle of which it terminates in the Tentorium. The Falx becomes broader as it extends backward, and about its middle part it reaches from the upper part of the calvary to the Corpus Callosum of the Cerebrum.

The use of the Falx is to separate the two hemispheres of the brain, to form the sinuses, and to support the Tentorium.

#### TENTORIUM.

The TENTORIUM OR SEPTUM CEREBELLI passes outward from the termination of the Falx, being connected posteriorly to the transverse ridges of the Os Occipitis, laterally and an-

riorly to the ridges of the Petrous portion of the Temporal bone, and anteriorly to the posterior Clinoid processes of the sphenoid bone.

A great OVAL FORAMEN is left between these two sides of the Tentorium, in which is situated the Tuber Annulare or junction of the Cerebrum and Cerebellum.

The use of the Tentorium is to form a floor for the posterior part of the cerebrum and a roof for the cerebellum; it also tends to render tense the Falx.

#### FALX CEREBELLI.

The FALX MINOR or SEPTUM CEREBELLI is situated between the lobes of the Cerebellum, passing from the inferior posterior part of the Tentorium, adhering to the inferior portion of the internal Crucial ridge of the Os Occipitis, and terminating at the posterior part of the Foramen Magnum.

#### SPHENOIDAL AND OTHER FOLDS.

Besides these greater folds, there is a small lateral one on each side of the Sella Turcica, which together form the Fossa of the Pituitary Gland.—There are likewise other two, one of which is situated in the base of the Cranium at the edge of the Foramen Lacerum.

#### ELONGATIONS.

There are several considerable elongations or productions of the Dura Mater.—The most important of these lines, the Spinal Canal, envelops the Medulla Spinalis.—Other elongations accompany the various nerves or their filaments in the Cranium.

## SINUSES.

The SINUSES OF THE DURA MATER are the *Superior Longitudinal Sinus*, the two *Lateral Sinuses*, the *Torcular Herophili*, the *Inferior Longitudinal Sinus*, the *Posterior Occipital Sinus*, the four *Petrosal Sinuses*, the *Circular*, the two *Cavernous*, and the two *Orbitary*.

All of these Sinuses have been described under the description of the Veins of the Head.

## TUNICA ARACHNOIDEA.

The TUNICA ARACHNOIDEA is situated immediately within the Dura Mater. It is a very thin, transparent, and tender membrane. It is expanded over all the convolutions of the brain, but does not pass between them. About the inferior part of the Brain, it can readily be elevated from the Pia Mater.—No vessels have hitherto been discovered in it.

## PIA MATER.

The PIA MATER considerably resembles the Tunica Arachnoidea, but is still more delicate and transparent. It is also extremely vascular.—It descends between all the convolutions of the Brain, and lines its Ventricles.

The use of the Pia Mater is to support and conduct the Vessels of the Brain.

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The Brain is divided into the *Cerebrum*, *Cerebellum*, and *Medulla Oblongata*.



## CEREBRUM.

## SITUATION.

The CEREBRUM occupies all the superior part of the Cranium.

## FORM AND COLOUR.

The Cerebrum is of an oval form, convex superiorly and flattened inferiorly, where, on each side, it is divided into three eminences corresponding to the cavities in the base of the Cranium. It is of a Medullary nature, its consistence pulpy, and externally of a greyish colour.

## DIVISION.

The Cerebrum is divided into *two great lateral portions* by the Falx. These portions are termed HEMISPHERES, and consist of a *Middle*, an *Anterior*, and a *Posterior Extremity*.—Their inferior elevations are also termed LOBES, which are on each side, denominated *Anterior*, *Posterior*, and *Middle*.

The ANTERIOR LOBES OF THE BRAIN rest upon the Orbital Processes of the Frontal and the Cribriform plate of the Ethmoid bone.

The MIDDLE OF LATERAL LOBES are situated in the cavities formed by the temporal and sphenoid bones.

The POSTERIOR LOBES rest upon the Tentorium.

The anterior and lateral lobes are separated from each other by a furrow corresponding to the anterior Clinoid and Transverse Spinous Processes of the Sphenoid Bone, which furrow has been denominated the FISSURA MAGNA SYLVII.

## CONVOLUTIONS.

The surface of the Brain is marked by a great number of elevated Convolution, which run in every direction, and have a different form in different parts of the brain. Between these, near the surface of the cerebrum, Superficial Veins of the Brain pass, and these convolutions are fixed throughout their whole depth to the folds of the Pia Mater, by an immense number of fine vascular filaments, which were denominated by RUYSCH *Tomentum Cerebri*.

These convolutions do not pass deep into the substance of the brain. There, however, exist within the convolutions of the external substance of the cerebrum similar and corresponding convolutions of its white internal part.

## CEREBRAL SUBSTANCE.

The CEREBRAL SUBSTANCE consists of two kinds, an *External* and an *Internal*.

The External substance being of a greyish or ash colour, is denominated its CORTICAL or CINERITIOUS PART.—The Internal substance is, from its white colour, denominated its WHITE or MEDULLARY PORTION.

The Medullary Portion of the Brain is of a firmer Texture than the Cineritious substance, with which it is however intimately connected. Indeed the two substances at many parts intermix. Cineritious matter may be found amongst the Medullary, and Medullary matter amongst the Cineritious. The former however is in much greater quantity than the latter, and its faint white striæ generally run in a Transverse and Parallel direction.

## CORPUS CALLOSUM.

By separating the hemispheres of the cerebrum, after having divided the Falx from the Crista Galli, and turned it backward, a longitudinal convex body named CORPUS CALLOSUM, or COMMISSURA SUPERIOR CEREBRI, is exposed to the view.—The middle of this body is marked by a longitudinal *Raphe* having a *Medullary Cord* on each side of it. These Cords, as well as the Corpus Callosum itself, enlarge considerably as they pass backward.—From each of these Medullary Cords small *Transverse Lines* pass outward.—Both ends of the Corpus Callosum are bent downward.

## CENTRUM OVALE.

By making a section of the central substance in a line parallel to the upper part of the Corpus Callosum, the CENTRUM OVALE of Vieussens comes into view. This consists merely of the white or medullary part of the Brain receiving an oval form from the arrangement of the cineritious substance around it, with which it is intimately connected. This Centrum Ovale forms a medullary arch over the lateral Ventricles of the Brain.

## LATERAL VENTRICLES.

The LATERAL VENTRICLES are two cavities, one situated toward the side of the Corpus Callosum, chiefly formed of medullary matter, and lined by the Pia Mater, which in that situation, is not very vascular.

These Ventricles pass some way in a horizontal direction from before backward; but are in other respects very irregular, having each three curved terminations named *Cornua*.

Their ANTERIOR CORNUA are placed on each side of the Septum Lucidum.

Their POSTERIOR CORNUA or *Digital Cavities* curve inward to each other as they pass backward.

Their INFERIOR CORNUA pass first downward, and then forward, terminating in the lateral lobes of the brain nearly under their anterior Cornua.

The CORPORA STRIATA are pyriform bodies, externally of a greyish colour, and having their greater extremities placed further forward, and nearer to each other than their posterior ones. They derive their names from their internal striated structure.

The THALAMI NERVORUM Opticorum are two considerable eminences placed beside each other, within the ventricles and between the posterior extremities of the Corpora Striata. Their external surface has upon it numerous small eminences, and their internal substance is striated, but less distinctly so than the Corpora Striata. The inner sides of these thalami are somewhat flat, and joined to each other in a slight manner by the Comisura Mollis, and from their posterior ends two white cords proceed called *Tractus Optici*.

There is a groove between the thalami nervorum opticorum and the corpora striata, in which, on each side, is situated a medullary cord called *Centrum Semicirculare Geminum* or *Tenia Semicircularis*.

The HIPPOCAMPUS MINOR is a small convex body arising from the Corpus Fimbriatum and placed in the posterior cornu of each lateral ventricle.

The CORPUS FIMBRIATUM or *Tenia Hippocampi* is a flat taper-like substance, situated in the inferior cornu of the Ventricle, and is, on each side, produced from the posterior crus of the formix.

The HIPPOCAMPUS MAJOR *Pedes Hippocampi* or *Cornua Ammonis* is a medullary eminence arising laterally from the Corpus Fimbriatum on each side, and placed in the inferior cornu of the lateral ventricles. These bodies pass through the whole length of the cornua, being small at their origin and enlarging as they advance. At the posterior Pillars of the Fornix they are intimately connected with them. The inner edge of the Hippocampus Major has a serrated margin, which is larger in Quadrupeds than in Man, but is less remarkable in Apes.

The FORAMEN of MONRO is situated between the anterior cornua of the lateral ventricles, and gives passage to the choroid plexus from the third ventricle.

The COLUMNÆ ANONYMÆ are numerous small columns passing round the superior and posterior sides of the lateral ventricles.

A net work of vessels called the CHOROID PLEXUS passes through these ventricles over the thalami from the third.

The sides of the ventricles are contiguous to each other, but they are constantly moistened with a fluid exhaled from the Pia Mater.

#### SEPTUM LUCIDUM.

The SEPTUM LUCIDUM is a thin and transparent partition, broadest before and curved at its edges, connected above to the Corpus Callosum, below to the Fornix, and consisting of two Laminæ, which, separating about their middle, form the FIFTH VENTRICLE of the BRAIN.

The Septum Lucidum divides the two Lateral Ventricles.

## FORNIX.

The FORNIX is a continuation of the Corpus Callosum. It is of an arch-like form, and is supported by four productions, called PILLARS or CRURA, two of which are *Anterior* and two *Posterior*.—The ANTERIOR CRURA are shortest, pass in contact with each other, and become larger at their lower ends.—The POSTERIOR CRURA are longer and more distant from each other, running in the course of the inferior Cornua of the lateral Ventricles.

The BODY OF THE FORNIX is broad posteriorly where it joins the Corpus Callosum, and narrow anteriorly where it is connected to the Septum Lucidum.—Below it is slightly joined to the Thalami, by a Membrane called *Tela Choroidea*, which joins the Choroid Plexus in the lateral Ventricles, after having passed over the Thalami.—The inferior side of the Fornix has upon it, toward its posterior part, several lines caused by blood-vessels, which from their arrangement are termed *Lyra* or *Psalterium*. These blood-vessels form a beautiful net-work over the third Ventricle, and receive the name of *Velum Interpositum*. This contains the *Vene Magnae Galeni* which run to the Torcular Herophili.

It is below the anterior part of the body of the Fornix, and over the fore-part of the third Ventricle that the *Oval Hole of Monro* is situated, and communicates with the third Ventricle by means of the

## ITER AD TERTIUM VENTRICULUM.

This is also denominated *Foramen Commune Anterius*, *Vulva* or *Iter ad Infundibulum*. It passes from between the Foramina Monroi to the anterior part of the Third Ventricle.



## THIRD VENTRICLE.

THE THIRD VENTRICLE is situated between the Thalami Nervorum Opticorum, below the Commissura Mollis and above the Crura Cerebri.

The INFUNDIBULUM may be considered as its anterior termination, which passes forward and downward and terminates in the Pituitary Gland situated in the Sella Turcica.

The FORAMEN COMMUNE POSTERIUS passes from the third Ventricle, between the Commissura Mollis and the Pineal Gland; but is prevented from communicating with the lateral Ventricles by means of the Fornix and the Tela Choroidea.

The ANTERIOR COMMISSURE is a Medullary Cord which passes at the fore-part of the third Ventricle, before the anterior Crura of the Fornix, through the Corpora Striata.

The INFERIOR COMMISSURA is formed by the Medullary substance of the bottom of the Ventricle crossing from one side to the other.

The POSTERIOR COMMISSURE is placed at the back of the third Ventricle under the root of the Pineal Gland.

The TUBERCULA QUADRIGEMINA are situated at the back of the third Ventricle, behind the posterior Commissure. Two of these are situated superiorly called *Nates*, and two posteriorly called *Testes*.

The PINEAL GLAND is situated above the Nates and under the posterior part of the Fornix. It arises by *Two Medullary Crura* from the Thalami Nervorum Opticorum and the anterior Crura of the Fornix, and is connected at its root to the posterior Commissure of the Brain. It is of a Conoidal form, being broadest at its base, of a Cineritious structure, and generally contains small Calcareous Concretions.



## ITER AD QUARTUM VENTRICULUM.

The ITER AD QUARTUM VENTRICULUM proceeds from the inferior posterior part of the third Ventricle and terminates in the fourth.

## CEREBELLUM.

## SITUATION.

The Cerebellum is situated in the inferior Depressions of the Occipital Bone and is covered by the Tentorium.

## DIVISION.

The Cerebellum is divided into two LOBES by the Falx Cerebelli; yet this division does not take place superiorly, as in the Cerebrum, but at its inferior posterior part.

These lobes are again divided into *Lobules*.

## CONVOLUTIONS.

The CONVOLUTIONS of the Cerebellum are extremely numerous, but much smaller and closer than those of the Cerebrum. They form a sort of Transverse arches over it, which decussate each other at various places, and between them the Pia Mater passes.

## EMINENCES.

The Cerebellum has two middle *Eminences* called from their form APPENDICES VERMIFORMES, one of which is situated at its anterior and superior, the other at its inferior and posterior part.

## INTERNAL STRUCTURE.

Like the Cerebrum, the Cerebellum is also composed of Cerebritious and Medullary matter; the former however bearing a greater proportion to the latter, than in the Cerebrum. —When the Cerebrum is cut transversely, the arrangement of the Medullary substance resembles somewhat a Tree with its branches, and has thence been named *Arbor Vitæ*.

## FOURTH VENTRICLE.

The FOURTH VENTRICLE is situated between the Cerebellum posteriorly and laterally, and the Medulla Oblongata anteriorly, and extends from the Inferior Tubercula Quadrigemina to the great Fissure of the Cerebellum.

The VALVULA MAGNA CEREBRI is a thin Medullary Lamina covering the superior anterior part of the fourth Ventricle, and extended from the Medulla Oblongata to the Cerebellum.

The CALAMUS SCRIPTORIUS is a narrow Cavity, pointed below like a writing Pen, and proceeding from the posterior part of the fourth Ventricle.

The Origins of the Portio Mollis are sometimes perceivable within the Ventricle.—The Plexus of Haller, composed of vessels and small globular bodies, may also be observed; and two Medullary tracts called Processes ad Testes proceed from the sides of the Valvula Magna or Velum Vieussenii.

## INFERIOR SURFACE OF THE BRAIN.

## CORPORA ALBICANTIA.

The CORPORA ALBICANTIA are two small round white bodies, situated in the base of the Brain, between its lateral

lobes. Various Medullary stria of the Brain seem to terminate in them.

#### CRURA CEREBRI.

These are two large white cords, situated immediately before the Corpora Albicantia. They arise from the Medullary part of the Cerebrum, and converge to their termination in the Tuber Annulare. They consist both of Medullary and Cineritious matter internally, but are altogether formed of Medullary fibres externally.—A dark portion of their internal Cineritious substance is termed *Locus Niger Crurum Cerebri*.

#### CRURA CEREBELLI.

The CRURA CEREBELLI are two white Cords which arise from the Trunk of the Arbor Vitæ and join the Crura Cerebri.

#### TUBER ANNULARE.

The TUBER ANNULARE or *Pons Varolii* is composed by the junction of these Crura. It is situated upon the Basilar portions of the Sphenoid and Occipital Bones. It is divided longitudinally by a groove for the Basilar Artery, and from that groove numerous Transverse Stria proceed to each side.—At the fore-part of the Tuber Annulare is placed the *Foramen Coccum Anterius*, and behind it the *Foramen Coccum Posterius*.

#### MEDULLA OBLONGATA.

The Medulla Oblongata extends from the Tuber Annulare to the Foramen Magnum, diminishing as it proceeds.—Along the middle of its inferior surface are situated two small eminences, which are divided from each other by a fissure, and

termed CORPORA PYRAMIDALIA.—Externally to them are situated two others, named from their form, CORPORA OLIVARIA and—External to these, other two less conspicuous named CORPORA PYRAMIDALIA LATERALIA.

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## PHYSIOLOGY OF THE BRAIN.

It is well known that the Brain is the Seat of the Soul, the organ of judgment and of volition; but of the uses of its individual parts we are, at present, totally ignorant. To assert, however, that we shall always continue so, would be indeed absurd, and presupposes in the person who makes the assertion a degree of knowledge which refutes itself. But the presumptuous asserters of this Doctrine proceed without data: they are themselves totally ignorant of it, and are too apt to consider that circumstance as a proof that it is impossible we should in future acquire any knowledge of it. The fact is, that the Physiology of the Brain has not till of late years been studied with any propriety: dry anatomical facts were merely accumulated, no relations, no analogies of parts were deduced, and anatomists seemed to expect an interesting and consistent Theory without the trouble of reflection. But of late years the labours of CAMPER, BLUMENBACH, and SOEMMERING, have eminently illustrated this part of Physiology, and have advanced it further than the works of some previous centuries had done.

## MEDULLA SPINALIS.

The MÉDULLA SPINALIS or *Spinal Marrow* is a continuation of the Medulla Oblongata, externally composed of Medullary and internally of Cineritious substance.

Commencing from the Foramen Magnum, it descends through the Vertebral Canal to the Sacrum, where it terminates in an immense number of large nerves, which are denominated CAUDA EQUINA.

The Spinal Marrow is, throughout its course, invested by the Dura Mater, Tunica Arachnoidea, and Pia Mater; and has also produced from the Pia Mater a Ligament, named Denticulatum, which commences at the Foramen Magnum, and, proceeding downward between the origins of the nerves, terminates at the Os Coccygis.—The use of this Ligament is to prevent the Spinal Marrow being stretched, and to maintain, in their situation, the origins of the nerves.

## USE OF THE SPINAL MARROW.

The Spinal Marrow is evidently an appendage of the organ of judgment, but its particular Physiology is as little understood as that of the Brain.

## NEUROLOGY.

The nerves are long, white, firm cords composed of *FASCI-  
CULI*, closely connected, and again divisible into *FIBRILLÆ*,  
which may be subdivided to the utmost degree of minuteness.

### FORM OF THE NERVES.

The nerves are not of a cylindrical, but of a conical form,  
the apex of each cone being turned to the Brain, and its base  
toward the extreme parts of the body.

### ORIGIN.

The nerves are generally said to arise from the Cerebrum,  
Cerebellum, Medulla Oblongata, and Spinal Marrow; those  
arising from the three former sources being termed *CEREBRAL*,  
and those from the latter, *SPINAL NERVES*. It would, how-  
ever, be more philosophical to consider the nerves as arising  
from the extreme parts of the body, and terminating in the  
Brain.

### GANGLIA.

The *GANGLIA* are hard knots placed at the union of nerves,  
and larger in circumference than the nerves which combine  
to form them. They are very different in form and size, hav-  
ing more numerous vessels and thicker coats than the nerves.

The Ganglia are supposed to constitute new sources of nervous influence.

## DIVISION.

The nerves consist of Trunks, Ganglia, Plexus, Branches, Twigs, Capillary Terminations, and Papillæ.

## NUMBER.

Of the Nerves there are *Thirty-nine Pairs*, and of these *Nine* arise directly from the Brain, and are named *Cerebral*; *Thirty* arise from the Spinal Marrow, and are termed *Spinal Nerves*. The Spinal Nerves are again subdivided into *Eight* pairs of *Cervical*, *Twelve* of *Dorsal*, *Five* of *Lumbar*, and *Five* of *Sacral Nerves*.

## USE.

The nerves serve both for the purpose of transmitting impression to the brain and action to the muscles.



## NERVES ARISING FROM THE BRAIN.

The CEREBRAL NERVES arise in pairs, and are, from the arrangement of the foramina through which they pass, divided into the *First, Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth and Ninth* pairs. Each of these pairs has also derived a name from its distribution or from its use, as *Olfactory, Optic, Motores Oculorum, Pathetici, Trigemini* (divided into *Ophthalmic, Superior Maxillary, and Inferior Maxillary*), *Abducentes, Auditorii* (divided into *Portio Mollis and Portio Dura, or Nervus Facialis*), *Par Vagus*, and *Lingualis*.

### FIRST PAIR, OR OLFACTORY NERVES.

The OLFACTORY NERVES arise by three separate branches on each side of the Brain, from the Corpora Striata, near the distribution of the internal Carotid Artery.

They pass forward under the anterior lobes of the brain, which are furrowed to receive them. They both slightly converge, and become somewhat larger as they approach the Cribriform plate of the Ethmoid Bone.—Here each of them forms a sort of oblong bulb, and divides into an immense number of minute filaments, which pass through the foramina of the bone.

Having passed through these foramina, they divide into two series, which, being joined by a branch of the fifth pair of nerves, are distributed, one to the Septum, the other to the Ossa Turbinata Superiora.

These nerves in their passage change their degree of con-

sistency: in their course from the Corpora Striata they are excessively tender and soft, but, in passing through the foramina of the Ethmoid bone, their filaments receive a covering from the Dura Mater, and assume the consistency of other nerves.

No Anatomist has yet traced any filament of the Olfactory nerves to the inferior turbinated bones; yet, from the structure of these bones, it cannot be doubted that the Olfactory nerves are expanded over them also.

### SECOND PAIR, OR OPTIC NERVES.

The OPTIC NERVES arise on each side from the Thalami Nervorum Opticorum, make a large curve outward around the Crura Cerebri, and derive a second origin as they pass forward from the small tubercles at the lower part of the Infundibulum.

Becoming slenderer they run obliquely inward and forward till they unite at the anterior part of the Sella Turcica; again dividing, each runs forward and outward to the Foramina Optica, passing through which they perforate the ball of the eye internally to the middle of its posterior part, and expanding from the Retinæ.—These nerves derive externally a covering from the membranes of the brain, and are internally of a purer white colour than any of the other nerves.—See further account of this nerve under the description of the Eye.

### THIRD PAIR, OR MOTORES OCULORUM.

The MOTORES OCULORUM are much less in size than the optic nerves. They arise between the Tuber Annulare and Corpora Albicantia by numerous filaments.

Passing outward, they perforate the Dura Mater on each side a little before the posterior Clinoid processes of the Sphenoid bone.

noid bone, and run along the superior part of the Cavernous Sinuses external to the Carotid arteries.

They then pass through the Foraminal Lacera, and divide into several branches, the first of which, after contributing to a small Ganglion, called the *Ophthalmic* or *Lenticular*, is distributed to the ball of the eye; the others pass to all the muscles of the eye, except the *Obliquus Superior* and the *Abductor Oculi*.

#### FOURTH PAIR, OR PATHETICI.

The *NERVI PATHETICI* are the slenderest nerves of the body, and arise from the posterior part of the base of the Testes.

They take a long course around the *Crura Cerebri*, and perforate the *Dura Mater* externally and posteriorly to the third pair. They pass in the Cavernous Sinuses externally to the third pair at first, but afterwards obliquely cross over that pair and emerge from the *Foramina Lacera*. Passing then over the superior muscles of the eyeball, they are expanded upon the *Trochleares*.

#### FIFTH PAIR, OR TRIGEMINI.

The *NERVI TRIGEMINI* arise by two portions, the anterior of which is small, and the posterior large, from the side of the *Tuber Annulare*, where it is joined by the *Crura Cerebelli*.

They perforate the *Dura Mater* near the point of the *Oss Petrosus* a little below the *Tentorium*.—Here they form on each side a large flat Plexus, which, descending close by the side of the Cavernous Sinus, is covered by a layer of the *Dura Mater*, and constitutes the *Ganglion Gasseri*. From this Ganglion, which is situated transversely, and is of a semilunar form, three large branches proceed, all of them arising from its curved or inferior edge.—These branches are the *Anterior*

or *Ophthalmic*, the *Middle* or *Superior Maxillary*, and the *Posterior* or *Inferior Maxillary*.

### FIRST, OR OPHTHALMIC BRANCH.

The OPHTHALMIC BRANCH passes at first below the third pair, and then crosses over it, being, in its passage, connected to the fourth pair, and giving off a branch which unites with that of the sixth pair to form the great Sympathetic Nerve.—Passing into the Orbit through the Foramen Lacerum, it divides into several branches:

1. The SUPRA ORBITAR, or largest branch, which, perforating the upper part of the Periosteum of the Orbit, divides into a smaller and a larger branch.—The smaller branch, named SUPRA-TROCHLEARIS, passes above the Obliquus Superior, and is expanded upon the upper eyelid and contiguous parts.—The larger branch, named FRONTALIS, passes through the Superciliary Foramen to be distributed to the forehead.

2. The NASAL BRANCH, which, distributing some filaments to the eyeball, passes over the optic nerve to the inside of the orbit between the Adductor and Obliquus Superior—Here it transmits, through the Foramen Orbitarium Internum Anterior, a branch which passes over the cribriform plate of the Ethmoid bone, at the fore part of which it passes out and runs beneath the Ossa Nasi to be distributed to the tip of the nose.—The remainder of the nerve which passes beneath the Obliquus Superior is named INFRA-TROCHLEARIS, and is expanded about the inner angle of the eye.

3. The LACHRYMAL BRANCH gives off two considerable twigs; one to the Lachrymal Gland, and another to the Lenticular Ganglion.

The LENTICULAR GANGLION, being formed by this twig, and by a small branch of the third pair, is situated external to

The optic nerve within the orbit. It is very small and of an oblong flat form. From this Ganglion the Ciliary nerves pass to the ball of the eye, where, perforating the Sclerotic coat at the back part of the globe, they pass through it to the Choroid, along which they run to the Ciliary circle, where each filament generally divides into two branches, which pass forward like Radii to the Iris, forming themselves into arches, and running to its interior margin.

## SECOND, OR SUPERIOR MAXILLARY BRANCH.

The SUPERIOR MAXILLARY NERVE passes out at the Foramen Rotundum of the Sphenoid bone, and divides into several branches.

1. The SPHENO-PALATINE BRANCH, which passes through the Spheno-Palatine Foramen, but previously dismisses two branches through the Foramen Vidianum of the Sphenoid bone, one of which, passing into the Foramen Innomiatum of the Os Petrosum, joins the Portio Dura in the Fallopiian Aqueduct, and the other joins the great Sympathetic Nerve in the Canalis Carotideus. Having passed through the Spheno-Palatine Foramen, the nerve is chiefly distributed upon the posterior part of the Nares, the Eustachian Trumpet, and the Sphenoidal Sinus, giving off a twig which communicates with the Palatine by passing through the Foramen Incisivum.

2. The PALATO-MAXILLARY, OR PALATINE BRANCH, which passes through the canal formed by the nasal process of the palate bone and the inside of the posterior part of the upper Maxillary bone, and is distributed to the palate, the Velum Pendulum Palati, the superior Maxillary bone, the membrane of its Sinus, and the Molar Teeth—A few branches of it pass externally to the cheek, and another emerges from the Foramen of the Os Maxillæ to the face—The nerve, now passing into

the canal in the bottom of the orbit, is named **INFRA-ORBITARY**.—Here it gives off small twigs to the anterior teeth, to the Antrum Highmorianum, and to the orbit—Passing out upon the cheek by the Infra-Orbitary Foramen, it gives several considerable branches to the under eyelid, the side of the nose, the upper lip, and contiguous parts.

### THIRD, OR INFERIOR MAXILLARY BRANCH.

The **INFERIOR MAXILLARY NERVE** passes through the Foramen Ovale of the Sphenoid bone, and is distributed to the parts surrounding the lower jaw, and situated immediately beneath it. Its branches are,

1. Several **SMALL BRANCHES** to the Temporal, Masseter, Pterygoid and Buccinator Muscles, and to the fore part of the Ear.

2. The **LINGUAL BRANCH**, which passes between the external and internal Pterygoid Muscles, and sends off branches to the muscles of the Tongue and Sublingual Gland, and also a small Ganglion, from which nerves proceed to the inferior Maxillary Gland—The Trunk itself is distributed, by small filaments, to the papillæ of the edges and tip of the Tongue.

3. A **SMALL BRANCH** to the Sublingual Gland, and the Mylo-Hyoideus.

4. The **PROPER INFERIOR MAXILLARY** branch, which passes through the canal of the jaw, supplying the bone of the teeth, and emerging by the Foramen Mentale to the Chin.

### SIXTH PAIR, OR ABDUCENTES.

The **NERVI ABDUCENTES** are, except the Nervi Pathetici, the smallest given off from the brain. They arise from the Medulla Oblongata, between the Tuber Annulare and the Corpora Pyramidalia.



They enter the Dura Mater behind the posterior Clinoid process of the Sphenoid bone, at the inside of the passage of the fifth pair—Running a considerable way below the Dura Mater, and within the Cavernous Sinus, between the Ophthalmic Nerve and Carotid Artery, they pass through the Foramina Cera to the Abductor Muscles of the Eyes—Within the Cavernous Sinus, they send off several filaments, which contribute to form the great Sympathetic Nerves.

### SEVENTH PAIR or AUDITORY NERVES.

The auditory nerves consist of two portions, viz. the *Portio Mollis* or *proper Auditory Nerve*, and the *Portio Dura* or *Communicans Faciei*.

#### PORTIO MOLLIS.

The name of this nerve is derived from its degree of consistence. It is that portion to which the term auditory alone might be applied. It derives its origin from the anterior part of the fourth ventricle, and having passed round the medulla oblongata it derives an addition from the tuber annulare, and passes on to the Portio Dura. Reaching the Meatus Internus it divides in it into an *Anterior* and a *Posterior Fasciculus*. The *POSTERIOR FASCICULUS* supplies the Cochlea by passing through the Tractus Forminulosus of the base of the Modiolus, through the Canaliculi of the Modiolus, and the Cribriform plates of the Lamina Spiralis to the pulpy membrane which lines all the sides of the Scalæ, and is in contact with the Perosteum. It is principally distributed to, and forms a Plexus upon that portion of it which covers the Lamina Spiralis, and terminates in a delicate Plexiform expansion upon the Zona Cochlea.

This Fasciculus sends a *Central Branch* up through the middle



of the Modiolus to the Infundibular Membrane, and a *lateral Branch* from the Cochlea to the pulp of the Vestibulum.

The ANTERIOR FASCICULUS divides into three Branches; its *first* and *greatest Branch* having upon it a gangliform Intumescence, and passing through the first Macula Cribrosa near the commencement of the Fallopian Aqueduct to the posterior portion of the vestibular pulp, termed the Alveus Communis of the Semicircular Canals, and to the Membranous Ampullæ of the superior and exterior Canals; the *middle Branch* passing through the Macula Cribrosa, which, in a manner, forms the commencement of the Tractus Foraminulosus Cochleæ to the Sacculus Sphericus or anterior portion of the Vestibular Pulp; and the *smaller Branch* passing through the Foramen in the posterior side of the Meatus Internus to the membranous ampulla of the posterior Semicircular Canal.

Thus, the three branches of the anterior Fasciculus enter the Vestibulum, and are distributed in Plexus, then lost upon the posterior and anterior portions of its pulp, or upon the Septum Vestibuli Membranaceum which divides it, or, passing into the Semicircular Canals by their Ampullæ, they disappear upon their membranes situated at some little distance from the Periosteum.

#### PORTIO DURA.

The PORTIO DURA OF FACIAL NERVE arises from the fourth Ventricle of the Brain, and passes through the Canalis Communis Nervorum into the Fallopian Aqueduct.

It first gives off a branch to the Mastoid Cells, another to the Stapedius, a still greater Branch to join the *Vidian Nerve*, which is a reflected Branch of the second Branch of the fifth pair entering the Foramen in the superior anterior surface of

the Os Petrósum, and another called the *Chorda Tympani*, crossing the Cavity of the Tympanum, between the Long Leg of the Incus and the Handle of the Malleus, supplying in its course the Laxators of the Membrana Tympani and joining a selected twig of the Lingual Branch of the inferior Maxillary nerve or third Branch of the fifth pair, running backward along the outside of the Eustachian Trumpet. The remainder of the Trunk emerges from the Foramen Mastoideum, the opening of the Fallopian Canal, expands upon the face, and retains the name of *Facial*.

In passing from the Foramen Stylo-Mastoideum, the Portio dura is situated behind the Parotid Gland. Soon after this, it gives off an *Occipital Branch* which runs as far as the *Obliqui superiores Capitis*, and, in its passage, supplies the posterior part of the Ear.—Next a *Digastric* and a *Stylo-Hyoideal* Branch. It also gives off, to the anterior part of the external Ear, a small branch which joins another of the inferior maxillary nerve, and a twig to join the great sympathetic. It sends upwards several branches through the Parotid Gland to the side of the head, where they form a great Plexus called the *Plexus serinus*.

This Plexus consists of several portions, namely, the *Descending*, the *Inferior Facial*, the *Middle Facial*, the *Superior Facial*, and the *Temporal* Portions.

1. The DESCENDING BRANCHES pass to the external parts of the neck, communicating below with the superior Spinal Cervical Nerves, and above with

2. The INFERIOR FACIAL BRANCHES, which are distributed to the outside of the under Jaw, there communicating with the former, with twigs of the third branch of the fifth pair, and with

3. The MIDDLE FACIAL BRANCHES which pass transversely over the Masseter Muscle. and supply the Cheek, Lip, Nose, &c. communicating below with the former nerve, at different parts with the superior and inferior Maxillary Nerves, and above with

4. The SUPERIOR FACIAL BRANCHES which are distributed to the upper part of the Cheek, the outer angle of the Eye, the supercilia, &c. communicating below with the former Nerve, at different parts with the Ophthalmic and superior Maxillary Nerve, and above with

5. The TEMPORAL BRANCHES, which are distributed on the Temple, and which communicate with the last mentioned Nerve and with the Frontal twigs of the Ophthalmic.

#### EIGHTH PAIR OR PAR VAGUM, AND GLOSSO-PHARYNGEAL NERVE.

The EIGHTH PAIR of nerves arise from the Medulla Oblongata, near the posterior part of the sides of the Corpora Olivaria, by disgregated fibres.

As they are passing into the anterior part of the Foramina Jugularia, each of them is joined by a nerve which arises from the Cervical Nerves, and ascends through the Foramen Magnum behind the Dura Mater.—This is denominated the ACCESSORY NERVE.—Having passed together through the Foramina Jugularia, the Accessory Nerve leaves the Par Vagus and passes downward and outward through the Sterno-Cleido-Mastoideus, which it supplies and terminates in the Trapezius.

When the Par Vagus has passed from the Jugular Foramen, it gives branches to the Tongue, the Larynx and Pharynx, and to the Ganglion of the great Sympathetic Nerve.—The

erve now descends the neck on the outside of the Carotid Artery, and behind the Internal Jugular Vein, to enter the Cavity of the Thorax, when it gives off several branches.

1. The Recurrent Nerves which arise just as it enters the Thorax.—The right Recurrent, from being situated before turns round behind the Subclavian Artery, while the left passes round the curve of the Aorta.—They then return upward along the sides of the Œsophagus, supplying it with branches, and terminate in the Larynx and Pharynx.

No Physiological cause has yet been assigned either for the course of the Recurrent or of the Accessory Nerves.

2. SEVERAL BRANCHES which arise near the origin of the Recurrents and are distributed to the Pericardium or join twigs of the great Sympathetic to form the Cardiac Plexus.

3. Descending behind the Lungs the Par Vagum gives branches to them, and, having joined other Filaments from the recurrent nerve and from the great sympathetic, forms on each side a Plexus denominated the RIGHT and LEFT PULMONARY.

4. The *Right Trunk* running behind the Œsophagus, and the *left* one before it, supply the Œsophagus, and communicating numerous twigs forms the ŒSOPHAGEAL PLEXUS.

5. Having accompanied the Œsophagus into the Abdomen forms the *Anterior* and *Posterior Stomachic Plexus*.

6. The Par Vagus then communicates with the branches of the great Sympathetic Nerve and contributes to the great *Trilunar Ganglion*.

## NINTH PAIR OR LINGUAL NERVES.

The LINGUAL NERVES arise from the sides and from the inferior part of the Corpora Pyramidalia by disgregated fibres which

unite into bundles.—They pass out of the Cranium by the Anterior Condylloid Foramina of the Os Occipitis, adhering in their passage to the Par Vagum and to the Intercostal Nerve.

Immediately after their exit they give a branch to join the first and second cervical nerves, and to be distributed to the Thyroid Gland and contiguous parts.

The ninth pair now descends between the internal Carotid artery and the internal Jugular Vein; but passes forward over the former, where it gives off the Occipital. It then passes over the facial artery and behind the facial Veins, and, giving off some twigs in its passage, terminates in the Tongue.

About the place where the Lingual nerves cross the Carotids, they send downward on each side a branch which is named *Descendens Noni*, and which passes in the course of the Carotid artery, giving off some twigs, and communicating with the first, second, and third cervical nerves, from which also twigs pass to several muscles.



## NERVES OF THE TRUNK.

### INTERCOSTAL OR GREAT SYMPATHETIC NERVE.

The GREAT SYMPATHETIC NERVE is either formed by the reflected branch of the superior maxillary nerve and by those of the sixth pair, or these nerves are sent upwards to join the above-mentioned pairs. Commencing, however, with the branches sent off in the Cranium, we shall describe this nerve in the usual way.

These Branches emerge connected from the Cranium through the Canalis Carotideus, and descend on the anterior part of the sides of all the true and false vertebræ, being joined in their passage by twigs from all the spinal nerves, and forming a Ganglion at their junction with each.—Upon the sides of the cervical vertebræ this nerve forms three Ganglia, which are denominated the *Superior, Middle, and Inferior Cervical*.

The SUPERIOR CERVICAL GANGLION is situated about the second Vertebra of the Neck, from which twigs proceed to the other Ganglia, the Par Vagus, the ninth pair, and toward the Cardiac and the Pulmonary Plexus.

The MIDDLE CERVICAL GANGLION is situated about the fourth Vertebra of the Neck, from which also some twigs proceed.

The INFERIOR CERVICAL GANGLION is situated about the last Cervical Vertebra; from it some twigs proceed to the Cardiac Plexus.

Having formed these Ganglia, the great Sympathetic Nerve passes down upon the Dorsal Vertebræ, and forms other Ganglia with the Dorsal Nerves.—Leaving the Vertebræ, it passes by the side of the Aorta and over the Iliac Vessels, but again returns to the spine near the termination of the Sacrum, where it joins its fellow.

From the Third, Fifth, Seventh, Eighth, Ninth and Tenth Dorsal Ganglia branches proceed down the Thorax, and perforate the Diaphragm, where they unite to form the Splanchnic Nerve, which, having passed a short way, forms, with the aid of the nerves already mentioned, the SEMILUNAR GANGLION, situated on the fore-part of the Aorta. The nerves arising around this Ganglion are denominated the *Solar Plexus*.

From the Semilunar Ganglia are produced the nerves which supply the Viscera, viz. the COELIAC, HEPATIC, SPLENIC, &c.



PERIOR MESENTERIC, RENAL, INFERIOR MESENTERIC, MESO-COLIC, HYPOGASTRIC and SPERMATIC Plexuses, the names of which explain their situations.

## NERVES ARISING FROM THE SPINAL MARROW.

There are *Thirty pairs* of SPINAL NERVES.

Each of these arises by two filaments from the side of the Spinal Marrow. These filaments uniting, form a small ganglion which is invested by the Dura and Pia Mater, and these membranes are continued over the nerve proceeding from them.

Each nerve passes out of the spinal canal by a foramen formed between the sides of the bony bridges of two vertebræ.

The Spinal Nerves consist of *Cervical, Dorsal, Lumbar* and *Sacral* Nerves.

### CERVICAL NERVES.

Of these there are *Eight Pairs*.—The FIRST arising at the commencement of the Spinal Marrow, make their exit below the edge of the Foramen Magnum and above the side of the Atlas, external to which they form a ganglion, and being distributed to the occiput and upper part of the neck, they receive the name of OCCIPITAL.—The SECOND PAIR dividing into two parts, sends one to join the accessory nerve, and another to the Extensors of the Head, and to the occiput.—The THIRD PAIR sends twigs to the middle ganglion of the great Sympathetic, to the trunk of the Third Pair, to the accessory nerve, to the descendens noni and to the Diaphragmatic Nerve. It also supplies the Sterno-Mastoideus, gives off the Inferior and Middle Cutaneous and the great posterior auricular, and terminates in the Levator Scapulæ and extensors of the neck.—



The FOURTH PAIR sends one branch to the Fifth Cervical, and another which forms the commencement of the Diaphragmatic by uniting with the Third and Fifth Pairs; it also sends branches to join others from the Second and Fifth Pairs, and from the accessory nerve.—The FOURTH, FIFTH, SIXTH, SEVENTH and EIGHTH PAIRS uniting form the BRACHIAL PLEXUS, and also contribute to the Accessory and Diaphragmatic nerves.

### DORSAL NERVES.

Of these there are *Twelve Pairs*.—The FIRST PAIR contributes to the Brachial Plexus.—The last Five Pairs are named Costal from their passing to the cartilages of the ribs,—and the whole of them supply the muscles of the back, sides, abdomen and diaphragm.

### LUMBAR NERVES.

Of these there are *Five Pairs*, which are distributed about the loins, and contribute branches to form the *Posterior Crural* and *Obturator* nerves.

### SACRAL NERVES.

Of these there are *Five Pairs*, of which the Three or Four superior after supplying the Pelvic Viscera, unite to form the Sciatic Plexus. The other two Pairs are distributed about the muscles of the Anus and Os Coccygis.

### DIAPHRAGMATIC NERVE.

The DIAPHRAGMATIC OR PHRENIC NERVE is formed from the Second, Third, Fourth, and Fifth Cervical Nerves, the First Dorsal and a twig from the Great Sympathetic. In the neck it descends along the external anterior part of the Scalenus anticus, and passes into the Thorax between the Subclavian artery and vein and behind the anterior end of the first rib. It then descends over the root of the Lungs, and along the Pericardium to the Diaphragm.

## NERVES OF THE UPPER EXTREMITIES.

The Brachial Plexus of which the formation has already been described, supplies all the nerves of the Upper Extremities.

The SCAPULARY NERVE arising first, passes through the notch in the upper edge of the scapula, and supplies the Supra and Infra-Spinatus.

The ARTICULAR NERVE passes into the Axilla and between the Subscapularis and Teres Major, and the Latissimus Dorsi, proceeds round the upper part of the Humerus, accompanying the Posterior Circumflex artery, and distributing branches to the Deltoid, Teres Minor, &c.

The CUTANEOUS NERVE passes down nearly in the course of the Radial and giving off several unimportant twigs, at last divides into an EXTERNAL and INTERNAL BRANCH.—The EXTERNAL BRANCH passes behind the Median Basilic Vein, whence it sends several branches to the anterior part of the fore arm.—The INTERNAL BRANCH passes before the Basilic Vein to the inside of the elbow, whence it sends one or two branches to the back of the fore-arm over the upper part of the flexor muscles and other twigs down upon the anterior part of the fore-arm as far as the little finger.

ANOTHER CUTANEOUS NERVE, accompanying for a short way the Ulnar, divides at the Axilla into two branches; one of which passes to the Triceps on the posterior part of the arm, and the other is distributed upon its inner side.

The MUSCULO-CUTANEOUS NERVE, or *Perforans Casserii*, penetrates the upper part of the Coraco-Brachialis, and then passes between the Brachialis Internus and Biceps, supplying all these muscles with branches. It next descends be-

hind the Median Cephalic Vein and external to the Supinator Longus, distributing branches as far as the thumb.

The SPIRAL NERVE, sometimes called RADIAL, passes between the Ulnar Nerve and Axillary Artery, then between the heads of the Triceps and behind the Humerus to its outer condyle, supplying the muscles in its course, and giving off behind the Humerus a subcutaneous branch. Passing between the Extensor Carpi Radialis Longior and the Brachialis Internus, it arrives at the head of the Radius where it divides into a *Superficial* and a *Deep-seated Branch*.—The SUPERFICIAL BRANCH, descending for a short way with the Radial Artery, crosses about the middle of the radius to the back of that bone, and divides into a *Volar branch* which passes to the anterior part of the thumb, and a *Dorsal branch* which sends twigs to the back of the thumb, but the principal branches of which run along both sides of the Index and middle finger, and along the Radial side of the ring-finger.—The DEEP-SEATED BRANCH passes below the Supinator Brevis to the back of the fore-arm, where it lies under the Extensor Communis Digitorum and Extensor Primi Internodii Pollicis, supplying the muscles in its course and ultimately terminating on the back of the hand.

The MEDIAN NERVE descends the arm before the Brachial Artery. At the fore-arm it passes over the tendon of the Brachialis Internus, behind the Pronator Teres and between the Flexor Sublimis and Flexor Carpi Radialis, in its course giving twigs to the muscles and an *Interosseal Branch* which supplies the deep-seated muscles of the fore-arm. The trunk of the nerve, passing behind the annular ligament and aponeurosis palmaris, sends branches to both sides of the Thumb, Index, and Middle finger, and to the Radial side of the ring-finger, also small branches which perforate the aponeurosis or accompany the palmar arteries.

The ULNAR NERVE passes along the inner side of the Triceps and through the groove behind the internal condyle of the Humerus, then through the heads of the flexor muscles, and accompanies the Ulnar artery to the hand. At the end of the Ulna it divides into an *Anterior* or *Palmar*, and a *Posterior* or *Dorsal Branch*.—The DORSAL BRANCH anastomosing with twigs from the Spiral, supplies the ulnar side of the ring finger, and both sides of the little finger.—The PALMAR BRANCH, having passed over the annular ligament, and under the aponeurosis, similarly supplies these fingers by means of its *Superficial Portion*; while its deep-seated portion, forming an arch which corresponds to the deep arch of the arteries, gives off various twigs to the Lumbricales and neighbouring muscles.

The INTERCOSTAL-HUMERAL NERVES proceed to the upper extremity from the second and third Intercostal Nerves, and are distributed to the axilla and posterior part of the fore arm.



## NERVES OF THE LOWER EXTREMITIES.

The OBTURATOR NERVE is produced by the union of the second, third and fourth Lumbar Nerves. Descending over the Psoas muscle, it passes between the external and internal iliac vessels along the side of the Pelvis, and perforates the upper part of the obturator ligament, supplying the muscles in its course.

The ANTERIOR CRURAL NERVE is derived from the four superior Lumbar nerves. Passing first behind and then external to the Psoas muscle, it runs under Poupart's ligament, and

is there situated between the Femoral Artery and Vein. It now divides into four great branches.—The MIDDLE CUTANEOUS, which descends upon the fore part of the thigh.—The ANTERIOR CUTANEOUS, which runs to the knee somewhat internally to the former.—The INTERNAL CUTANEOUS, which has a similar destination, and is situated still more internally.—The NERVUS SAPHENUS accompanies the Vena Saphena in its course. Behind the knee, it gives off the NERVUS SAPHENUS MINOR, which, passing over the internal posterior part of the leg, and distributing twigs to its integuments, is continued behind the Malleolus Internus to the integuments of the foot. The Trunk of the Nervus Saphenus, still attending its vein, terminates upon the integuments of the inner anterior part of the foot.

The SCIATIC NERVE is derived from a Plexus formed by the junction of the fourth and fifth Lumbar with the first, second, and third Sacral nerves. Within the Pelvis, it gives off the Pudic nerve to the parts of generation, &c. and the Gluteal to the hips. Passing from the Pelvis under the Pyriformis, and through the greater Sacro-Sciatic notch, it passes between the Tuberosity of the Ischium and the Trochanter Major, and then between the flexors of the thigh to the ham, where it assumes the name of POPLITEAL. The principal branches which it gives off in this course are the POSTERIOR SUPERIOR CUTANEOUS to the posterior integuments of the thigh as far as the knee.—The INTERNAL SUPERIOR CUTANEOUS to the upper part of the thigh.—The INTERNAL INFERIOR CUTANEOUS, which proceeds to the integuments of the calf of the leg.—Several BRANCHES about the middle of the thigh to the Biceps, Triceps, &c.

The POPLITEAL NERVE, the continuation of the Sciatic, passes somewhat obliquely from the inner side of the ham,



where it is placed between the Popliteal Vessels and the Integuments. It soon divides into the *Peroneal* or *Fibular* and the *Tibial Nerve*.

The PERONEAL NERVE first sends off the EXTERNAL CUTANEOUS to the integuments of the outer side of the leg,—then a second Cutaneous to the integuments of the outside of the foot —At the head of the Fibula, it divides into a SUPERFICIAL BRANCH, which passes between the Peroneal muscles to the external anterior part of the leg, and, upon the upper part of the foot, gives dorsal branches to the toes, and a DEEP-SEATED BRANCH which supplies the muscles above the former.

The TIBIAL NERVE runs between the heads of the Gastrocnemius, penetrates the origin of the Soleus, and, accompanying the Posterior Tibial Artery, descends, between the last-mentioned muscle and the Flexor Longus Digitorum, toward the sole of the foot. In this course it sends off several branches, the most important of which is the COMMUNICANS TIBIÆ, which, on the posterior part of the leg, accompanies the Vena Saphena Minor to the outer side of the foot. The trunk of the nerve then passes through the depression on the inside of the Os Calcis, and, in the sole of the foot, divides into an INTERNAL PLANTAR NERVE, which gives off numerous twigs, the principal of which supply both sides of the three first toes, and the tibial side of the fourth; and an EXTERNAL PLANTAR, the chief branches of which are distributed to both sides of the little toe, and to the fibular side of the fourth toe.

# A GLOSSARY

## OF

### ANATOMICAL TERMS.

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#### A.

**ABDOMEN.** *The cavity of the belly; from abdere to hide, because it envelopes the viscera.*

**ACETABULUM.** *The articular cavity of the Os Innominatum; named from its resemblance to the Acetabulum, or Vinegar Cup of the Ancients.*

**ACINI.** *A species of Glands; from Acini Grapes.*

**ACROMION.** *A great process of the Scapula; from ακρος end, and ωμος the shoulder.*

**ADENOLOGY.** *A discourse on the Glands; from αδην a gland, and λογος a discourse.*

**AMNION.** *A flocculent Membrane enveloping the Fetus; from αμνιος a Lamb's skin.*

**AMPHIARTHROSIS.** *A species of articulation permitting obscure motion; from αμφω both, and αρθρωσις articulation.*

**ANASTOMOSIS.** *The communication of the cavities of vessels; from ανα through, and σωμα a mouth.*

**ANATOMY.** *Dissection; from ανα through, and τεμνω to cut.*



ANCON. *The Elbow*; from ἀγκων embracing, because by the flexure of this joint embraces are effected.

ANCONIUS. *A muscle of the Elbow*; from ἀγκων.

ANCONOID. *A great process of the Ulna*; from ἀγκων the Elbow, and εἶδος form.

ANCIOLOGY. *A discourse on the Vessels*; from αἷσιον a vessel, and λόγος a discourse.

AORTA. *The name of a great Artery*; from ἀή air, and τηρεῖν to hold; so termed because it was anciently supposed to contain merely air.

APONEUROSIS. *A tendinous expansion*; from ἀπό from and νεύρον a tendon; for so was that word sometimes understood.

APOPHYSIS. *A process of a bone*; from ἀποφύω to proceed from.

ARACHNOIDES. *A web-like membrane*; from ἀράχνη a spider, and εἶδος form.

ARTERY. From ἀή air, and τηρεῖν to hold, because the ancients supposed that Arteries contained only air.

ARTHRODIA. *A species of articulation*; from ἀρθρῶν to articulate.

ARYTÆNOID. *A name given to certain cartilages and muscles of the Larynx*; from ἀρυταῖνα a funnel, and εἶδος form.

ASTRAGALUS. *A bone of the Tarsus*; named from its similarity to a die used in the games of the ancients, from ἀστράγαλος a die.

ATLAS. *The first cervical Vertebra*; named from its sustaining the Head.

AZYGOS. *A name given to parts to which no others correspond*, from the privative α and ζυγος; a fellow.

## B.

BRACHIUM. *The arm.*

BRONCHIA. *The two great divisions of the wind-pipe.*

BURSA. *A bag; from βυρσα.*

BURSOLOGY. *A discourse on the bursa mucosa; from βυρσα a bag, and λογος a discourse.*

## C.

CALVARIA. *The top of the Cranium.*

CANCELLI. *Lattice Work.*

CARDIA. *The upper orifice of the Stomach; from its situation near καρδια the Heart.*

CAROTID. *The chief Arteries of the Head; from καρω to occasion sleep, because if tied with a Ligature they induce Coma.*

CARPUS. *The Wrist; from Καρπος.*

CHORION. *The outer membrane of the Fetus; from χωρεω to escape, because it generally accompanies the Fœtus from the Uterus.*

CHOROID. From χωριον the chorion, and ειδος form; named from its vascularity, resembling that of the chorion.

CLAVICULA. *The Collar-bone; named from its resemblance to the Clavis or Key of the Ancients.*

CLINOID (*Processes*). *Five processes of the Ethmoid bone; from κλινη a bed, and ειδος likeness; from the resemblance which they give the Sella Turcica to a Couch.*

CLITORIS. *A part of the female Pudendum hid by the labia; from κλειω to hide.*

COLON. *The first of the large Intestines; from κοιλος hollow, because it is generally found empty.*

CONDYLE. *Any great eminence of the Joints; from κονδυλος.*

**CORACO.** *Belonging to the Coracoid process of the Scapula.*

**CORACOID.** From κοραξ a Crow, and εἶδος form; *like a Crow's beak.*

**CORONARY.** From resemblance to a corona or crown.

**CORONOID.** From κορωνη a Crown, and εἶδος form; *like a Crown.*

**COTYLOID.** From κοτυλη the name of a measure, and εἶδος form.

**CRANIUM.** *The Skull*; from κρανιον.

**CREMASTER.** The name of a muscle from κρεμνω to suspend; because by this the Testis is suspended.

**CRIBRIFORM.** *Sieve-like*; from Cribrum a sieve.

**CRICOID.** *Ring-like*; from κρικος a ring and εἶδος form.

**CRURA.** *A name given to several parts*; from their resemblance to legs.

**CUBOIDES.** *A bone of the Tarsus*; from κυβος a cube, and εἶδος form.

**CUNEIFORM.** *Wedge-like*; a name given to several bones from cuneus a wedge, and forma form.

## D.

**DARTOS.** *A supposed muscle of the Scrotum.*

**DELTOID.** *A muscle resembling the Greek letter Δ*; from Delta and εἶδος form.

**DIAPHRAGM.** *A muscle separating from the Thorax the Abdomen*; from διαφραττω to divide.

**DARTHROSIS.** *A genus of articulation expressing moveable connexion*; from διαρθρω to articulate.

**DIGASTRIC.** *Two-bellied*; from δις twice, and γαστηρ a belly.

**DIPLOE.** *The cellular substance between the two Tables of the Skull.*

**DUODENUM.** *The first portion of the small intestine*; so named from its not exceeding the breadth of twelve fingers.

**DURA MATER.** *The external Membrane of the Brain ; called Dura from its strength, and Mater because it was supposed to be the origin of all other membranes.*

## E.

**EMBRYO.** *A term applied to the Fetus during the first month.*

**ENARTHROSIS.** *A species of articulation ; from εν in, and αρθρον a joint.*

**ENTERIC.** *Intestinal ; from εντερον an intestine.*

**EPIDERMIS.** *The scarf Skin ; from επι upon, and δερμις the Skin.*

**EPIDIDYMIS.** *An appendage to the Testis ; from επι upon, and διδυμος a Testicle.*

**EPIGASTRIC.** *The upper region of the Abdomen ; from επι upon, and γαστηρ the Stomach.*

**EPIGLOTTIS.** *The Laryngeal Cartilage placed over the Glottis ; from επι upon, and γλωττις the Glottis.*

**EPIPHYSIS.** *The end of a long bone separated from it by a cartilage ; from επι upon, and φυω to grow.*

**EPIPLOON.** *The Membrane which hangs from the Stomach upon the Intestines ; from επιπλεω to swim upon.*

**ETHMOID.** *Sieve-like ; from εθμος a Sieve, and ειδος resemblance.*

## F.

**FASCIA.** *A tendinous sheath embracing the muscles ; from Fascis a bundle.*

**FALCIFORM.** *Scythe-like ; from falx a Scythe.*

**FASCICULUS.** *A small bundle ; from fascis a bundle.*

**FAUCES.** *The cavity between the Mouth and the Pharynx.*

## G.

**GALACTOPHEROUS.** *Milk-conducting*; from γαλα milk, and φερειν to carry.

**GANGLION, pl. GANGLIA.** *A sort of intumescence upon nerves.*

**GASTROCNEMIUS.** *The muscle forming the calf of the Leg*; from γαστηρ a belly, and κνήμη the Leg.

**GENIO.** *Belonging to the Chin*; from γενειον the Chin.

**GENU.** *The Knee.*

**GINGLYMUS.** *A species of articulation*; from γιγλυμος a hinge.

**GLENOID (Cavity).** *A shallow cavity*; from γληνη a cavity, and εἶδος resemblance.

**GLOSSO.** *Belonging to the Tongue*; from γλωσσα the Tongue.

**GLOTTIS.** *The Aperture of the Larynx behind the Tongue*, from γλωσσα the Tongue.

**GLUTÆUS.** *A muscle of the Hip*; from γλευτος the Buttock.

**GOMPHOSIS.** *A species of articulation expressing immoveable connexion*; from γομφος a nail, because one bone is fixed in another bone as a nail in a board.

## H.

**HARMONIA.** *A species of articulation expressing immoveable connexion*; from ἄρω to fit together.

**HELIX.** *The outer ring of the External Ear*; from εἰλειν to turn round.

**HEPAR.** *The Liver.*

**HYALOID.** *A name given to the Capsule of the Vitreous Humour*, from its glossy appearance; from ὑαλος glass, and εἶδος form.

**HYMEN.** *The membrane placed at the commencement of the vagina in virgins*; from ὕμην Hymen, the god of Marriage.

**HYO:** *Belonging to the Os Hyoides; from ὑοειδής the Os Hyoides.*

**HYO.DES.** *The bone of the Tongue; named from its resemblance to the Greek letter υ, and εἶδος form.*

**HYPOCHONDRUM.** *The region of the body which is situated under the Cartilages of the false ribs; from ὑπο under and χονδρος a Cartilage.*

**HYPOGASTRIC.** *The lower region of the Abdomen; from ὑπο under, and γαστήρ the Stomach.*

## I.

**ILEUM.** *The third portion of the small Intestine; from εἰλεῖν to turn, being always convoluted.*

**ILIUM.** *The superior part of the Os Innominatum; so called from its supporting the small intestines of that name.*

**ISCHIUM.** *The posterior inferior part of the Os Innominatum; from ἰσχεῖν, to sustain.*

## L.

**LACUNÆ.** *The openings of the Glands of the Urethra and Vagina; from Lacus.*

**LAMBDOIDAL (Suture);** named from its resemblance to the letter Λ; from Lambda, and εἶδος form.

**LARYNX.** *The immediate organ of Voice.*

## M.

**MASSETER.** *A muscle of the Jaw; from μασσασθαι, to chew.*

**MASTOID.** *Breast-like; from μαστός a breast, and εἶδος form.*

**MEDIASTINUM.** *A duplicature of the Pleura dividing the Thorax; from Medium, the middle.*

**MESENTERY.** *A duplicature of the Peritoneum supporting the intestines; from μέσος the middle, and εντέρον an Intestine.*



MESOCOLON. *A duplicature of the Peritoneum supporting the Colon*; from *μεσος* the middle, and *κολον* the Colon.

METACARPUS. *That portion of the hand below the Carpus*; from *μετα* after, and *καρπος* the wrist.

METATARSUS. *That portion of the foot below the Tarsus*; from *μετα* after, and *ταρσος* the Tarsus.

MYLO. *Belonging to the Molares*; from *μυλη* a Grinder.

MYOLOGY. *A discourse on the Muscles*; from *μυς* a muscle, and *λογος* a discourse.

## N.

NEUROLOGY. *A discourse on the Nerves*; from *νευρος* a nerve, and *λογος* a discourse.

## O.

ODONTOID. *Tooth-like*; from *οδους* a Tooth, and *ειδος* form.

ŒSOPHAGUS. *The canal leading to the Stomach*; from *οιειν* to carry, and *φαγειν* to eat.

OLECRANON. *The head of the Ulna or Elbow*; from *ωλενη* the Ulna, and *κρανον* a head.

OMENTUM. *An Adipose Abdominal Membrane*; named from *Omen* an omen, because the soothsayers anciently prophesied from its examination.

OMO. *Belonging to the shoulder*; from *ωμος* the shoulder.

OSTEOLOGY. *A discourse on the Bones*; from *οσεν* a bone, and *λογος* a discourse.

## P.

PANCREAS. *A Gland of the Abdomen*; named from its fleshy appearance; from *παν* all, and *κρεας* flesh.



**PARENCHYMA.** *The spongy substance connecting the vessels of the Lungs, Placenta, &c. is so called from παρεγκυειν to pour through.*

**PAROTID (Gland).** From παρα near, and οὖς the ear; because it is placed near the ear.

**PELVIS.** *A bason-like cavity; from πελὺς a bason.*

**PERICARDIUM.** *The membrane surrounding the Heart; from περι around, and καρδιά the heart.*

**PERICRANIUM.** *The membrane covering the Skull; from περι around, and κρανιον the Cranium.*

**PERIOSTEUM.** *The membrane surrounding the Bones; from περι around, and οστέον a bone.*

**PERISTALTIC (Motion of the Intestines);** from περισελλειν to contract.

**PERITONEUM.** *A membrane lining the Abdomen; from περιτεινω to extend around.*

**PHALANX.** *A term applied to the arrangement of the bones of the fingers and toes; from φαλαγξ a line of troops.*

**PHARYNX.** *A membranous bag at the posterior part of the mouth.*

**PHRENIC.** *Belonging to the Phren or Diaphragm.*

**PHYSIOLOGY.** *That Science which treats of the functions of organized beings; from φυσί; nature, and λόγος; a discourse.*

**PİA MATER.** *The inner membrane of the Brain.*

**PLACENTA.** *The after-birth; from its resemblance to πλακας a cake.*

**PLATYSMA-MYOIDES.** *A cutaneous muscle of the Neck; from πλατυ; broad, μυ; a muscle, and ειδο; form.*

**PLEURA.** *A membrane lining the Thorax.*

**PLEXUS.** *A net-work of vessels or nerves; from Plectere to weave.*

**PRÆPUCE.** *The fore-skin of the Penis.*

**PSOAS.** *The name of a muscle; from being situated in ψοα the*

PTEREGOID (*process*). From πτερυξ a wing, and εἶδος form; like a wing.

PYLORUS. *The lower orifice of the Stomach which separates it from the Intestines*; from πυλω to guard.

## R.

RAPHE. *A suture*; from ῥαπῖω to sew.

RENES. *The Kidneys*; from ῥεῖν to flow; because the urine flows through them.

RETINA. *The reticular expansion of the Optic nerve within the eye*; from rete a net.

RHOMBOIDES. *The name of a muscle*; from ῥομβος a rhomboid, and εἶδος form.

ROTULA. *The knee-pan*.

## S.

SACRUM. *The name of a bone*; from sacrum sacred; it having been usual to offer it in sacrifices.

SALVATELLA. *A vein of the foot*; from salvo to preserve; because the opening of it was thought to preserve health.

SANGUIS. *The blood*.

SARTORIUS. *The name of a muscle*; from sartor a tailor; so called because tailors more especially use it in crossing their legs.

SCAPHA. *The depression of the external ear between the crura of the anti-belix*; from its resemblance to a σκαφη or boat.

SCAPHOIDES. *A bone of the carpus*; named from its resemblance to a boat from σκαφη a boat, and εἶδος form.

SCLEROTIC. *A name given to the strongest membrane of the eyeball*; from σκληροειν to make hard.

SELLA TURCICA. *A cavity of the sphenoid bone, from imaginary likeness to a Turkish saddle*.

SESAMOID (*bones*); from σισαμη a sort of grain, and εἶδος form.

**SIGMOID.** *Resembling the letter Σ; from sigma, and εἶδος form.*

**SPHENOID.** *Wedge-like; from σφην a wedge, and εἶδος form.*

**SPHINCTER.** *A name given to such muscles as surround and contract openings; from σφιγγειν to contract.*

**SPLANCHNOLOGY.** *A discourse on the viscera; from σπλaxxovov an intestine, and λογος a discourse.*

**SYMPHYSIS.** *A genus of articulation; from συν with, and φειν to grow.*

**SYNARTHROSIS.** *A genus of articulation; from συν with, and αρθρον a joint.*

**SYNCHONDROSIS.** *A species of articulation by cartilage; from συν with, and χονδρος a cartilage.*

**SYNDESMOLOGY.** *A discourse on the ligaments; from συνδεσμος a ligament, and λογος a discourse.*

**SYNDESMOSIS.** *A species of articulation by ligament; from συνδεσμος; a ligament.*

**SYNEUROSIS.** *A species of articulation by membrane; from συν with, and νευρον a membrane.*

**SYSSARCOSIS.** *A species of articulation by muscles; from συν with, and σαρξ flesh.*

**SYSTOLE.** *The contraction of the heart and arteries; from συσσελλω to contract.*

## T. .

**TENDON.** From τεινω to stretch.

**THORAX.** *The upper part of the Trunk; from θορεω to leap, because the heart leaps within it.*

**THYRO.** *Belonging to the Thyroid Cartilage.*

**THYROID.** *Shield-like; from θυρεο; a shield, and εἶδος form.*

**TRACHEA.** *The Wind-pipe; called Trachea from its roughness; from τραχυ; rough.*

**TRAPEZOID.** *Four-sided; from τραπεζιον a trapezium, and εἶδος form.*

**TROCHANTER.** *A process of the Os Femoris; from τρεχω to run.*

**TROCHLEA.** *A pulley; from τρεχω to run.*

**TROCHOIDES.** *A variety of articulation; from τροχος; a wheel, and εἶδος; form; moving as a wheel upon an axis.*

## U.

**ULNA.** *A bone of the fore-arm.*

**URETER.** *The duct from the kidney to the bladder; from ὕρον urine.*

**URETHRA.** *The passage for the urine from the bladder.*

**UVEA.** *The posterior surface of the Iris; named from its resembling in beasts the colour of grapes, from uva a grape.*

**UVULA.** *The soft round body which descends from the middle of the soft palate; named from its resemblance to a grape.*

## V.

**VALVES.** *Small membranous duplications in arteries and veins, preventing the return of the blood.*

**VERTEBRÆ.** *The bones of the Dorsal Spine; from vertere to turn.*

**VOMER.** *A bone of the septum of the nose; named from its resemblance to a ploughshare; from vomere to turn up.*

## X.

**XIPHOID.** *Sword-like; from ξίφος; a sword, and εἶδος; form.*

## Z.

**ZYGOMA.** *The junction of the zygomatic process of the temporal and molar bones; from ζυγο, a yoke.*

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